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THE TREATMENT OF PURPURA HEMORRHAGICA

HAROLD W. JONES, M.D.
AND
LEANDRO TOCANTINS, M.D.
PHILADELPHIA

The title "purpura hemorrhagica" is chosen purposely to withdraw attention from the term "essential thrombocytopenia." Several observers have reported cases of this disease in which the platelets were relatively high or normal in number and yet hemorrhagic phenomena were present. On the other hand, platelets may number less than 100,000 without hemorrhagic phenomena. We have confirmed these observations in our group of cases and are convinced that the platelet factor, although of importance, is not an essential feature in this disease.

Capillary hyperpermeability, or capillary weakness, is essential for the production of hemorrhagic phenomena, which may occur if this condition is present alone or if both capillary hyperpermeability and platelet deficiency are found. However, if platelet deficiency is present alone, the hemorrhagic phenomena may not result. We feel, therefore, that the most important single factor, or in other words the common denominator, in this disease is capillary hyperpermeability.

The best index available of this state is the increase in bleeding time. Bleeding time should be set forth as an indicator determining progression or retrogression in this disease. In many of our cases we have found the platelets at a low level, but the bleeding time returned to normal long before there was an appreciable increase in the platelet count. Frequently, the bleeding time has lengthened without change in platelet figures. From our observations in a large group of cases, we feel that the control of the bleeding time, that is, keeping it within normal limits, has prevented many of the untoward results noted in the treatment of purpura.

This report is based on a study of fifty-three patients. The group is divided as follows:

A. Acute:
1. Acute progressive.
2. Acute retrogressive, or spontaneous recovery.
3. Acute becoming chronic.

B. Subacute or Chronic:
1. Chronic without acute hemorrhagic phenomena.
2. Chronic with subacute hemorrhagic phenomena.
3. Chronic with acute fulminating hemorrhagic phenomena.

From the Department of Medicine, Jefferson Medical College of Philadelphia.

This study was made possible by a grant from the J. Ewing Mears Research Fund.
Read before the Association of American Physicians, Atlantic City, N. J., May 4, 1932.

Because of lack of space, this article is abbreviated here by the omission of three charts and the diets. The complete article appears in the authors' reprints.

By acute progressive we mean that type of purpura hemorrhagica which either is fulminating from the very beginning until there is a distinct emergency, or progresses from a minor state to one of a major emergency, owing to hemorrhage. The second group, acute retrogressive, is that which may be mild at first and gradually disappear, or the hemorrhagic symptoms may be severe, reach a fulminating stage but suddenly become retrogressive, and spontaneous cure occurs.

TREATMENT

Spontaneous Recovery.—Any discussion of the treatment of this disease must take into consideration the fact that a large number of the cases recover spontaneously. Eleven of our cases fall into this group. In order to evaluate any of the special forms of treatment set forth as helpful, spontaneous recovery must be given suitable consideration. One of our patients has been well, as far as hemorrhagic phenomena are concerned, for forty years, and another for twenty-nine years; yet the original condition was undoubtedly acute fulminating purpura.

Chart 1 is that of a boy, aged 12 years, with all the hemorrhagic phenomena, petechiae, ecchymosis, epistaxis, melena, hematuria, lengthening of the bleeding time and marked reduction in platelets, but with only a moderate reduction in hemoglobin and red blood cells. The condition cleared up spontaneously. No special form of treatment was given. Today he is symptom free and, with the exception of a positive capillary resistance and flicking test, is well.

Recovery Following Removal of an Infectious Process.—There is another group of cases in which spontaneous cure might occur but the presence of an infectious process retards recovery. It is well known that a contributing factor in the development of this disease is acute or chronic infection. Such patients may recover, but as long as the infectious process, tonsillitis, prostatitis or the like is present, recurrences may follow. Some of these eventually become the subacute or chronic type. Such patients may be cured by the removal of the infectious process. Four of our cases fall into this group.

The subacute or chronic form, in which there may have been an acute exacerbation at the onset, or an acute exacerbation may occur at any time, occasionally is cured by the removal of the infectious process. Two of our cases fall under this heading.

ACUTE FULMINATING PROGRESSIVE CASE

The acute fulminating progressive case, whether primary or an acute exacerbation of the chronic, is a true emergency. In many of these cases one should not wait for spontaneous recovery. Collapse may be precipitous. One of our patients was admitted at 10 o'clock in the morning, bleeding from all mucous membranes, but did not seem to be in a particularly

critical condition. The patient was of blood type I. We were not able to get a donor until 4 o'clock in the afternoon. She died suddenly at 3:50.

BLOOD TRANSFUSION

Blood transfusion, contrary to the experience of some observers, when used in small or moderate dose at frequent intervals, skilfully administered, is almost a

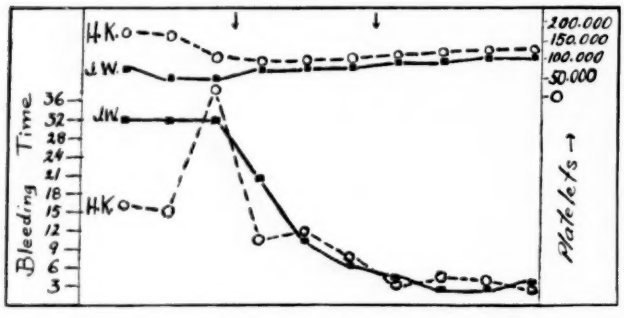

Chart 2.—Effect of blood transfusion (denoted by arrows) on bleeding time and platelets.

specific for a large number of cases of this type. Transfusion has been used successfully by us in twenty-four cases, or 46 per cent of the entire group. Chart 2 shows the results obtained by transfusion in two of our cases. These results are representative of those obtained in most of the acute progressive cases. The effect of transfusion on the bleeding time is evident. In both instances the bleeding time is lessened by one transfusion and reduced to normal by two. In these cases marked increase in the blood platelets failed to occur, which strengthens the point that the control of the bleeding time is a most important factor in the treatment of these cases.

It is important not to give a large transfusion unless the patient is in a critical condition from loss of blood. If such is the case, the same indications for dosage hold as in acute hemorrhage from any cause. We use 300 cc. as the standard dose in the adult, and vary this according to the square meter body surface of the individual. Young children are able to take more blood proportionately than the adult. The transfusion should be administered daily, at two, three or not more than five day intervals.

Transperitoneal or intraperitoneal transfusion is not effective in the control of the essential phenomena in these cases. As chart 3 shows, one of our patients (a child, aged 2½ years) was given two transperitoneal transfusions of 200 cc. each without any good effect; in fact, the bleeding time rose from thirty minutes to two hours following the second transperitoneal transfusion. However, when only 140 cc. of blood was given intravenously, the bleeding time dropped from this high level to four minutes within thirty-six hours. It was controlled by two more transfusions. This patient made an uninterrupted recovery and has been well since. We conclude that transperitoneal transfusion is not of value in the treatment of purpura hemorrhagica.

Failures have been reported in the treatment of the acute fulminating progressive case, and we have had this experience. One reason for failure is that the blood is not given often enough to control the bleeding time. Chart 4 demonstrates this point. In this case it was necessary to administer three transfusions in twenty-four hours in order to control the bleeding time. After the first transfusion, the bleeding time dropped from more than two hours to one and a half hours, and after the second to approximately one hour. After the third transfusion it went steadily down, until a normal level was reached in thirty-six hours. The blood platelet count, however, was continually below 50,000 per cubic millimeter.

A single transfusion may be sufficient to control the bleeding time and, even if anemia is present, it may not be necessary to give more transfusions as long as the bleeding time is within normal limits. However, the test for the bleeding time should be made daily, and if it shows a tendency to increase, or if the hemorrhagic phenomena recur, more transfusions must be given.

We think it is particularly important that the transfusion problem should not be left to an intern. Those of us who have had experience with this procedure know that when a transfusion is in the hands of an intern who has never performed one or who is careless, even though he has had some experience, it is incorrectly done in the majority of instances. Not long ago one of us (H. W. J.) witnessed such an incident. After an hour had elapsed, the blood of the donor was on the floor, the operator, the assistant and the patient, but none of it had got into the veins of the patient where it was so much needed. Not infrequently the intern reports that a stated amount of blood has been given and yet on investigation one finds either that no blood or only a small amount of partially coagulated blood has been administered. Reactions under such conditions must be expected. Whenever difficulty is encountered in giving blood, a reaction occurs.

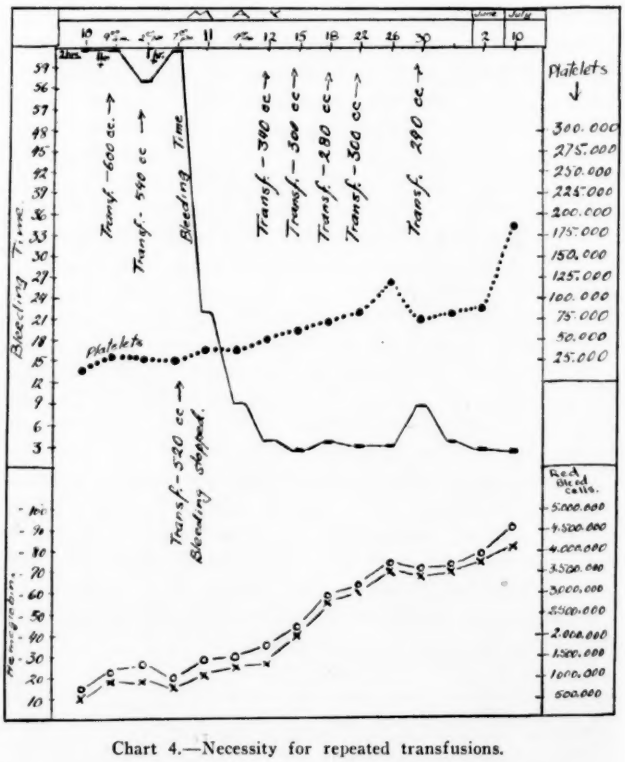

Chart 4.—Necessity for repeated transfusions.

Some observers have reported that after the use of transfusion in purpura hemorrhagica, exacerbation of the hemorrhagic phenomena has followed. It may be that these transfusions have been performed improperly or unskilfully. Large transfusions, that is, from 500 to 1,000 cc., are used as a routine in some clinics. Such amounts are seldom necessary. In some of our cases 100 cc. has proved sufficient to control the bleeding time, and we have wondered whether 25 cc. would not have

been just as satisfactory. In order that transfusions may be successful in these cases, the amount must be small in most instances, must be administered frequently enough to control the bleeding time and to keep it under control and must be given skilfully.

We do not wish to detract from the importance of the platelet factor in this disease, but, as we have mentioned before, this should not be emphasized as the essential point. Platelets may be little affected and yet the bleeding time may be brought under control by various forms of treatment. Bleeding time often rises before there is evidence of platelet reduction. The bleeding time is often brought under control many days before there is any notable increase in the platelet count. The three stages, therefore, in the treatment of acute progressive purpura are intravenous transfusion, removal of infection, and the use of diet, iron, ultraviolet ray, viosterol or halibut liver oil with viosterol 250 D.

DEATHS

We have had nine deaths, which may be included under the heading "acute progressive." Five of these patients died from two to twenty-four hours after admission, before any special treatment could be administered. One died from a double suppurative mastoiditis following middle ear disease due to a postnasal pack. We do not use postnasal packs to control the epistaxis. This can be done, usually, with small cotton pledgets saturated with a thromboplastic substance. With a firm packing, the already weakened mucous membrane is further injured; infection is more likely to spread into the middle ear, and the hemorrhage is often greater following the removal of the pack than before it was inserted. One patient had miliary tuberculosis as well, another a caseous tuberculosis of the mediastinal lymph glands.

The last patient in this group died of intracranial hemorrhage. The progress is indicated in chart 5. It will be noticed that three transfusions were given intravenously; the bleeding time, which had been lengthened, was reduced to normal, but two days later it began to rise. At this time another transfusion was indicated but was not given until six days later. The bleeding time was then twenty-four minutes. A large dose of blood was used, 475 cc. (for a boy, aged 8 years) with no benefit. Roentgen treatment of the spleen in stimulating doses was applied, and the bleeding time rose to forty-five minutes. The next day massive doses of x-rays were given, which was followed by a moderate drop in the bleeding time; extreme nausea and vomiting ensued. Signs of massive intracranial hemorrhage became evident, and the boy died twelve hours later. This case emphasizes the importance of controlling the bleeding time by the use of sufficient transfusions. The danger of intracranial hemorrhage is present whenever the bleeding time is greatly lengthened. It is to be noted, also, that although the platelets had risen from 50,000 to 180,000, the bleeding time was thirty-seven minutes.

TREATMENT OTHER THAN TRANSFUSION

Cures have been reported in many cases in which a great variety of substances have been used. Pennsylvania is noted for many things, but "hexing" is one of the unusual forms of treatment for which it is peculiar.

One of our patients in whom we felt we had obtained an unusually good result asserted that all her improvement was due to the fact that a factory worker, who is a hexer, threw a spell about her during the time when she was having the most pronounced hemorrhage. In a small town, not far from Easton, there is a hexer who is aware of the fact that many of these patients with purpura get well spontaneously within two or three weeks. Whenever a patient is presented to him with hemorrhagic phenomena, he makes a few passes over him, mumbles unintelligible words, and states that the change will come the next phase of the moon; and in many instances he is correct. One patient, a child, critically ill, for whom hope for recovery was gone, was anointed; and improvement followed immediately. These cases are examples of spontaneous recovery. Another patient gave a history of marked improvement after the injection of typhoid vaccine; another after one injection of triply distilled water intravenously. Whole liver has been suggested as a means of increasing platelets and improving the blood count in these patients. Liver extract, both by mouth and parenterally, has been used. We use Valentine's liver extract E-29. Iron goes back to 1857 as a method of treatment in this condition. In fact, at that time it was *the* treatment. Sulphuric acid has also been used. Ergot and turpentine were employed in the past with beneficial results. The enumeration of these forms of treatment only

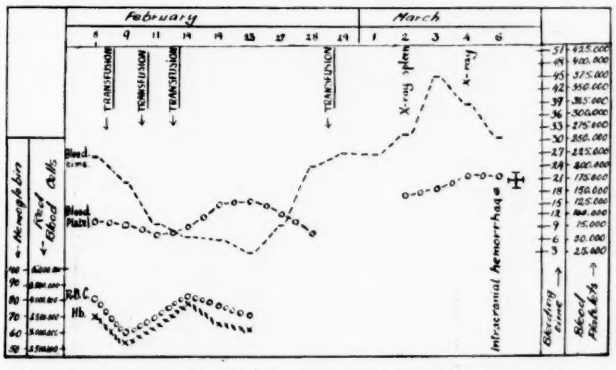

Chart 5.—Control of bleeding time: Insufficient blood transfusions.

serves to emphasize the point that many substances and many methods may seem to be effective in the treatment of this condition.

Diet.—Willan,[1] in 1801, suggested that proper attention be given to an abundant diet, free air and freedom from worry. Today, just as in pernicious anemia, one frequently obtains the history of a meat spare or meat free diet; we find in many of our patients a distaste for fresh vegetables, fruit and in some cases protein. Bancroft and Kugelmass[2] demonstrated the value of a high protein diet in the increasing number of platelets. It is useful during the hemorrhagic stage, when solid food is not well tolerated. The arrangement of an adequate diet during this period usually is neglected. So much attention is directed to the control of hemorrhage that as the patient has a distaste for food because of swallowed blood, and as coarse or solid food irritates the gums and increases the hemorrhage, the question of diet is slighted.

As soon as possible the high protein, high vitamin diet, with special attention to vitamin C, is given. This diet is used both during the convalescent period and while the patient is in the hemorrhage free state. Some of our cured patients have been on this diet for a number of years.

1. Willan, R.: On Cutaneous Diseases, London, 1808, p. 482.
2. Bancroft, F. W.; Kugelmass, I. N., and Stanley-Brown, Margaret: Evaluation of Blood Clotting Factors in Surgical Diseases, Ann. Surg. **90:** 161 (Aug.) 1929.

Vitamins: Many of our patients have reported a distaste for fresh green vegetables. Phillips [3] noticed an increase in platelets following the use of viosterol. We give viosterol or halibut liver oil with viosterol 250 D in the dosage of from 20 to 40 drops three times a day during the hemorrhagic and posthemorrhagic period.

Ultraviolet Irradiation.—Cramer and Drew [4] have pointed out that there is an increase in the platelet count after ultraviolet irradiation. Many of our patients have been benefited by exposure to the sun's rays:

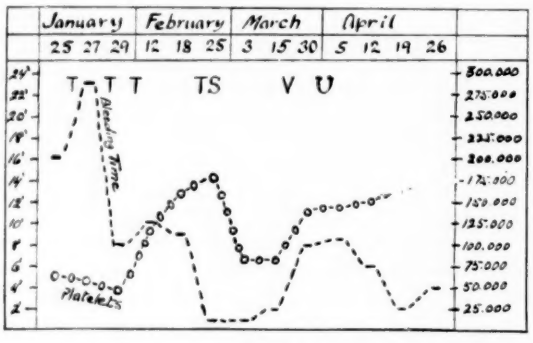

Chart 6.—Ineffectiveness of blood transfusions. There was little change in the number of platelets after splenectomy. *T*, transfusion; *S*, splenectomy; *V*, vitamin; *U*, ultraviolet rays.

when that is not possible, we advise the frequent use of the ultraviolet rays.

In not a few instances, using any or all of the three forms of treatment just mentioned, we have noticed an increase in the platelet count, a shortening of the bleeding time, and improvement in the weight and general health of the individual. However, one cannot state that any one or any combination of these forms of treatment is responsible for the results. Unless carefully controlled experiments are carried out in the animal or in the patient, the use of these measures must be more or less empirical. From a practical standpoint, we recommend their use, but we keep in mind always the fact that the improvement which seems to follow their use may be coincidental.

Drugs.—Solution of Anterior Lobe of Pituitary Gland: Two of the patients developed long profuse periods after they had been under control, the infectious process removed and various forms of treatment administered. In each instance, by the use of solution of the anterior lobe of the pituitary gland, we have been able to bring the periods under control and keep them regular and within normal limits.

Crotalus and Bothrops Antitoxin: This has been used in the treatment of acute purpura.[5] The Bothrops antitoxin would seem to be superior to the Crotalus antitoxin, as it contains a greater amount of substances necessary to neutralize the hemorrhagin toxin.

The treatment, then, of the acute progressive case is to give repeated whole blood transfusions intravenously in small amounts, at frequent intervals, so that the bleeding time is kept under control until the danger period is past or all hemorrhagic phenomena have disappeared. Infectious processes should be eliminated. A high vitamin, high protein diet with the addition of viosterol in large doses should be given. Iron, from 60 to 90 grains (4 to 6 Gm.) daily, or iron and liver and liver extract may be administered. The patient should get out in the open or receive treatment with the ultraviolet rays. Occasionally, when these methods are not proving entirely successful, high voltage roentgen therapy over the spleen may bring about the desired effect. However, roentgen treatment alone seldom brings about a cure. It is often attended with nausea and vomiting, which may be harmful. If other methods can be used successfully, roentgen therapy is not indicated. At times, none of the methods that we have set forth bring the symptoms under control. In the acute progressive form, such a result is rare. It occurred in only one case of our entire group. Splenectomy was then performed.

Splenectomy.—Splenectomy has been the standard form of treatment since 1916. Quénu [6] reported 122 cases in 1929 with a mortality of 16 per cent. Whipple [7] and Spence [8] have reported a mortality of 80 per cent of the acute cases. One cannot question the beneficial results following a splenectomy in some patients. However, as Whipple and Spence have set forth, these results are not always brilliant. Recurrence of hemorrhagic phenomena, rise in bleeding time and drop of the platelet count may occur.

Five of our patients have been treated by splenectomy, with one death. One of these patients was treated by the methods which we have already set forth but which failed to control the symptoms. The spleen was removed, after suitable preparation by transfusion, and Dr. Moon was able to isolate a streptococcus in pure culture. Since this time the patient has remained perfectly well.

POOR RESULTS WITH SPLENECTOMY

Chart 6 is that of a girl, aged 15 years, who received three transfusions without the complete disappearance of hemorrhagic phenomena and without controlling the bleeding time. One reason for failure was that a great

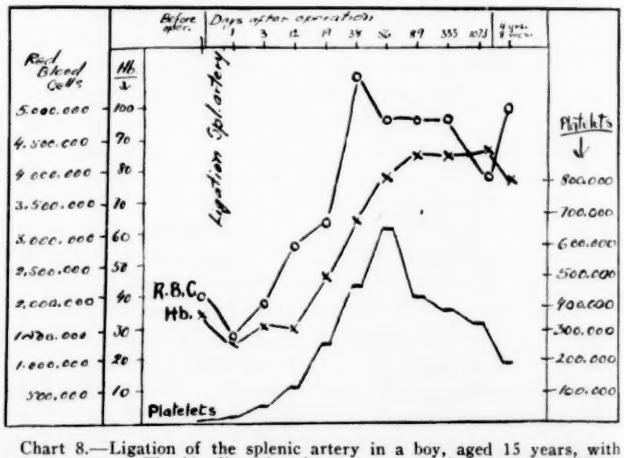

Chart 8.—Ligation of the splenic artery in a boy, aged 15 years, with acute purpura. The bleeding time became normal after operation. From Van Goidsenhoven.

deal of difficulty was experienced in the performance of the transfusions. We believe that some of the blood given was partially clotted. Rise in temperature and epistaxis followed in two instances. After a period of fifteen days another transfusion was given and a splenectomy was performed. The bleeding time was controlled, but the number of platelets fell from

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175,000 to 78,000. About three weeks after the operation, coincident with a moderate rise in the number of platelets, the bleeding time rose and hemorrhagic phenomena recurred. At this time five-minute general body exposure to ultraviolet rays at 30 inches were given daily; viosterol, 30 minims (1.8 cc.), three times a day and iron and ammonium citrate, 20 grains (1.3 Gm.), three times a day were given. The hemorrhagic phenomena disappeared, and the bleeding time was controlled. The platelets at present are slowly rising, and there is a gain in weight of 6 pounds (2.7 Kg.). We expect that a cure will be effected after tonsillectomy. This case emphasizes the fact that splenectomy is not always successful. Other measures must be utilized.

Splenectomy may not be successful if infection is not removed as soon as the patient's condition warrants it. In one of our patients, although splenectomy was performed and the patient was well for a time, the hemorrhagic phenomena recurred and until the tonsillar infection was removed these phenomena continued. This is shown in chart 7. The red cells and hemoglobin in this patient were normal, although the platelets, when we first saw her, were 56,000 and the bleeding time was twenty-three minutes. This case falls in the group of chronic cases, of which we had two, and forms, we think, the best indication for splenectomy. This was performed and followed by the usual rise in platelets. The hemorrhagic phenomena disappeared. Following a sore throat, eight weeks after operation, epistaxis, menorrhagia and petechiae developed. A tonsillectomy was performed and there has been no recurrence of symptoms for more than a year.

The indications for splenectomy are:

1. The acute progressive case which does not respond to other methods of treatment.
2. The chronic case with a normal, or nearly normal blood count, but long bleeding time and a low platelet count.
3. The chronic case with anemia and other manifestations which is not improved by transfusions, removal of infection and forms of treatment already set forth.

LIGATION OF THE SPLENIC ARTERY

One of the newer methods of treatment is that of ligation of the splenic artery. Von Stubenrauch,[9] in 1922, reported the first case of ligation of the splenic artery for treatment of this disease, although William J. Mayo[10] had suggested in 1910 that ligation of the splenic artery might be used in diseases of the blood just as ligation of the thyroid artery was resorted to in diseases of the thyroid gland. Thirty-four cases have been reported with but two deaths.[11] The results, as far as control of hemorrhagic phenomena and bleeding time are concerned, are similar to those obtained by splenectomy but are slower in production. In one of Van Goidsenhoven's[12] cases the platelets reached a high level nineteen days after operation and a peak fifty-six days after operation; this patient has been observed for four years and eight months and is clinically well.

The mortality is lower in this operation; the procedure is less difficult and requires less time. The ligation of the splenic artery is done from 5 to 6 cm. from the celiac axis. Necrosis or infarct has not occurred in the experimental cases and the spleen reduces in size from 28 to 70 per cent at the expense of the pulp.[13] It would seem that this method might supplant splenectomy. The indications for its use are similar.

COMMENT

In the discussion of the various forms of treatment of this disease, one is impressed by several striking features: first, the large number of spontaneous recoveries; second, the marked seasonal tendency, namely, the high incidence of cases in the spring; third, that a great number of substances or methods seem to be efficacious in aiding recovery, and, fourth, that transfusion acts, in many cases, almost as a specific.

Several years ago pernicious anemia was being discussed from similar standpoints. We have concluded that in any condition other than acute hemorrhage, in which transfusion is particularly beneficial, the solution of that problem does not lie in supplying new blood. We feel, therefore, that we are dealing with a deficiency disease, occurring in an individual with a so-called hemorrhagic constitution, the acute phase of which is precipitated by an acute or chronic infectious process which is active, or by other substances which affect capillary permeability.

In treating a patient with purpura one should not, we think, have immediate recourse either to splenectomy or to ligation of the splenic artery but should first consider that the individual may recover spontaneously. By carefully observing the bleeding time and the hemorrhagic phenomena, one may determine the progress of this disease. The index of the treatment, as we have already set forth, is the bleeding time, and this should be performed daily, both before and after transfusion.

Transfusion, properly administered, intravenously, in small amounts and frequently, controls the bleeding time, retards the production of hemorrhagic phenomena and brings about a cure. Following this, certain vitamins, such as viosterol or halibut liver oil with viosterol 250 D, may be used. Liver extract, ultraviolet rays, a high protein, high vitamin diet and iron should be administered. It is imperative that the patient report at frequent intervals, weekly at first and bimonthly later. Infectious processes should be removed. If hemorrhagic phenomena recur and the bleeding time rises, more transfusions should be given, or splenectomy or ligation of the splenic artery should be considered. Of the two, ligation of the splenic artery is the easier, and the mortality seems to be lower.

CONCLUSIONS

1. Spontaneous cures are frequent, but careful consideration of the diet should be made, and infection should be eliminated in order that the disease process may not recur.
2. The acute progressive case is best treated by small intravenous transfusions, frequently administered.
3. More attention should be paid to the bleeding time than to the platelet count.
4. It is imperative that the bleeding time be kept under control in order that the hemorrhagic phenomena may not recur and that intracranial hemorrhage may be prevented.
5. Infectious processes should be eliminated and the patient placed on a high protein, high vitamin diet.
6. Viosterol and iron should be given by mouth and ultraviolet ray treatment or outdoor life instituted.

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13. Ross, C.: Effetti della legatura dei vasi splenice sulla structura e funzione della milza, Ann. ital. di chir. **6**: 127, 1927.

7. Failure in the treatment described may be due to large transfusions, improperly administered transfusions, too long an interval between transfusions or an insufficient number of transfusions to control the bleeding time and relieve the symptoms.

8. There are a few patients who fail to respond to any or all the forms of treatment. Splenectomy or ligation of the splenic artery, after proper preparation by transfusion, should then be performed.

9. There are a few patients with a normal blood count, low platelet count and long bleeding time who are in the subacute or chronic stage, who are best treated, as far as is known now, by ligation of the splenic artery or by splenectomy.

10. We feel that the methods of treatment suggested are not specific and that it is possible that we are dealing with a deficiency disease occurring in an individual with a so-called hemorrhagic constitution, the acute phase of which disease is activated by a toxin or toxic substance affecting capillary permeability. In the not too distant future we feel that the treatment will be so simplified as to resemble that now used in pernicious anemia, for the two diseases have many points of similarity.

OBSERVATIONS ON THE EFFECT OF INSULIN IN THIN PERSONS

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Since its discovery, insulin has been employed as a therapeutic agent in a variety of miscellaneous disorders. Favorable results from its use have been reported, for example, in such apparently divergent conditions as cardiac decompensation,[1] scleroderma,[2] cancer,[3] toxemia of pregnancy,[4] certain types of uterine hemorrhages,[5] morphinism,[6] tuberculosis,[7] to make premature infants gain weight,[8] peptic ulcer,[9] neurosis,[10] hyperthyroidism,[11] rickets,[12] pellagra,[13] chronic ulcers and circulatory disturbances of the extremities,[14] and even to hasten the healing of experimental fractures.[15] But, next to its value in the treatment of diabetes, insulin appears to have its greatest practical usefulness in the treatment of nondiabetic malnutrition.

American pediatricians were the first to use the drug for this purpose. In 1923, Pitfield[16] injected 1 unit of insulin a day in two patients with infantile inanition, with a resulting gain in weight. Falta[17] deserves credit for introducing insulin in the treatment of nondiabetic undernourishment in adults. In 1925 he described the cases of three thin persons who had gained weight rapidly with insulin and who had held their weight after the omission of the drug. He stated that the added weight was not due to edema, because he gave theophylline without producing any diuresis. His patients were given 10 units of insulin from three to five times a day, and this dosage was increased to as much as 30 units five times a day. Subsequently, many other favorable reports of the beneficial effects of insulin in adult malnutrition have appeared. Few exact studies have been forthcoming, however, as to why it should be of value in this connection. This paper reports observations on certain effects of the drug in nineteen normal, thin individuals. These observations may help to explain some of the reasons for its popularity in the treatment of malnutrition and other nondiabetic conditions.

CLINICAL MATERIAL

The persons who were studied were seven men and twelve women, all physically normal, whose ages varied from 21 to 56 years. They were thin for their age, sex and height, ranging in weight at the beginning of these observations from 72 to 167 pounds (from 33 to 76 Kg.) and in height from 58 to 74 inches (from 147 to 188 cm.). All but one had been chronically underweight for years and had tried unsuccessfully to gain weight by such measures as forced eating, medicines or prolonged vacations and rest cures. In one case there had been no apparent reason for an acute loss of approximately 45 pounds (20 Kg.) in about five months' time.

Most of the group, admittedly, were somewhat nervous and apprehensive individuals, easily fatigued and lacking in energy. Some thought that they had indigestion or poor appetites and had been bandied about by a good many doctors, while others were considered to be hearty eaters but of the "thin type." All were anxious to gain weight and were extremely cooperative in this investigation.

They were taught how to measure and inject insulin and how to sterilize and take care of an insulin syringe and needles. They were encouraged to eat a liberal, unmeasured diet during the period of observation. The majority were given 10 units of insulin three times a day about twenty to thirty minutes before meals; four received 10 units twice daily, and in three the dosage of insulin was increased to 15 or 20 units three times a day.

PLAN OF INVESTIGATION

The general plan of study included various observations made in each case before, during and after the use of insulin. The weight of each patient and a note on his general condition were recorded at weekly

From the Medical Clinic of the Peter Bent Brigham Hospital.

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17. Falta, W.: Ueber Mastkuren mit Insulin und über insuläre Fettsucht, Wien. klin. Wchnschr. **38:** 757 (July 2) 1925.

intervals. The red blood count, blood sugar level, blood urea and nonprotein nitrogen concentrations, the basal metabolic rate and the phenolsulphonphthalein excretion were studied in seven cases. The excretion of nitrogen in the urine, the concentration of protein in the plasma, and the total blood, plasma and corpuscular volumes were followed in six cases. The fluid intake and output were measured in seven cases for a period of ten consecutive days during the use of insulin and for a similar period after the omission of insulin.

The methods utilized were as follows:

Standardized red blood cell counting pipets were used in counting the red blood cells, and venous blood counts were made. All blood examinations were made on fasting specimens. The blood sugar determinations were made according to the method of Folin and Wu.[18] The nonprotein nitrogen, the plasma-protein concentration and the urinary nitrogen were determined by Folin's micro-Kjeldahl method.[19] The nitrogen metabolism was studied by determining the nitrogen excretion in samples of twenty-four hour urine before insulin treatment was begun, and at intervals of from one to two weeks during and after the cessation of insulin therapy. The total blood, plasma and corpuscular volumes were determined according to the dye method described by Keith, Rowntree and Geraghty,[20] except that congo red was used instead of vital red. The basal metabolic rates were determined by a standard Benedict-Roth machine.

TABLE 1.—*Gain in Weight in Thin Patients with Insulin* *

Case	Standard Normal Weight for Height, Age and Sex	Weight Before Insulin	Weekly Weights of Patients During Insulin Therapy								Gain in Weight During Insulin Therapy	Weight After Insulin Was Omitted
			1	2	3	4	6	8	10	12		
1	134	97	102	106	112	113	112	112	117	117	20	Same in 8 months
2	137	105	113	116	118	120	120	121	...	...	16	Same in 6½ months
3	141	112	115	118	118	119	121	122	...	...	10	124 in 6 months
4	153	103	108	114	114	119	127½	...	...	...	24½	143 in 12 months
5	102	72	75	78	81	82	83	84	85	...	13	Same in 6 weeks
6	119	90	95½	97	99	101	103	104	105	...	15	Same in 11 weeks
7	135	89	95	98	100	102	104	105	108	...	19	113 in 10 weeks
8	135	98	103	106	107	110	111	114	117	...	19	Same in 7 weeks
9	167	141	146	151	155	159	163	169	171	172	31	183 in 14 months
10	116	97	101	104	107	108	110	...	...	...	13	Same in 6 weeks
11	178	167	172	175	178	179	179	...	...	...	12	Same in 6 weeks
12	154	134	141	145	145	146	...	...	...	...	12	Same in 9 weeks
13	157	132	139	141	143	145	...	...	...	...	13	140 in 10 weeks
14	150	134	137	140	143	...	...	...	...	...	9	Same in 6 weeks
15	133	113	116	119	122	...	...	...	...	...	9	114 in 6 months
16	119	97	97	99	101	104½	107	...	...	...	10	Taking insulin
17	126	100	103	106	108	...	...	...	...	...	8	Taking insulin
18	131	119½	124	...	...	...	...	...	...	...	4½	Taking insulin
19	156	132	136½	...	...	...	...	...	...	...	4½	Discontinued insulin because of local reactions

* Weight is recorded in pounds.

CLINICAL RESULTS WITH INSULIN THERAPY

After insulin injections were begun, each person began to gain weight at once, and several continued to gain with astonishing rapidity. This is shown by the weekly weight charts recorded in table 1.

There appeared to be two types of weight gain encountered. In one group the gain in weight was rapid and fairly continuous throughout the period of insulin therapy and in a few instances continued after the omission of insulin. In the other group, gain in weight was rapid at the beginning of insulin therapy, became less marked as time went on, and finally the weight remained stationary whether or not insulin was taken. It is interesting that very few of the individuals lost much of the weight gained, even at a considerable period after omission of insulin. Recently, Nichol,[21] in following up forty-two patients who gained weight with insulin, found that twenty-three maintained their increased weight for three months or less, while only nineteen kept their gained weight for six months or longer.

Shortly after the insulin injections were started, there was a marked improvement in sense of well being. Some of the patients remarked how wonderfully well they felt, while others said insulin made new individuals of them. Their appetites increased and occasionally became voracious. Most of the group said that they would gladly have taken insulin to feel so well even though there had been no gain in weight. They became less nervous and more cheerful and said they felt stronger, so that they became more efficient and could do more work. Thus, the use of insulin clinically appeared to have a notable tonic effect.

It was interesting to watch wrinkles disappear as weight was gained and to see the skin develop a healthy appearance. The added fat, as a rule, was distributed generally over the face, neck, breasts, abdomen, shoulders, back and buttocks. In one case, however, the deposit of fat was most obvious in the breasts and in another in the abdomen.

Local skin hypersensitiveness to insulin appeared at the site of injection in six of the nineteen cases, from one to six weeks after the beginning of treatment. This is a high incidence of this manifestation as compared with its relative rarity in patients with diabetes. On the other hand, Nichol [21] reported only three cases of urticaria in his much larger series. Tuft [22] feels that a reaction such as this to insulin is not necessarily a specific hypersensitiveness to insulin protein but rather is dependent on some irritant quality of the particular preparation used. In our group, however, persons who became sensitive remained sensitive to three different brands of insulin, thus suggesting that for some reason they had become insulin sensitive with exceptional ease.

CLINICAL CAUSE OF GAIN IN WEIGHT

The gain in weight accomplished by insulin must result from an increased intake of food or be due to an increased capacity of absorption and assimilation. Undoubtedly, the psychologic effect of insulin as an appetizer is significant. Persons not suffering from diabetes who take insulin learn about reactions and

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know that they are threatened with dire and unpleasant results unless they eat copiously after an injection. It is easy, too, for them to imagine a reaction and to eat extra food to avoid or cure one. On the other hand, it has been shown experimentally by Fonseca,[23] Okada[24] and Lueders and Watson[25] that insulin stimulates gastric juice and that it also increases the pancreatic and biliary secretions.

TABLE 2.—*Nitrogen Excretion in Thin Persons Taking Insulin* *

Case	Before Insulin Therapy	During Insulin Therapy						After Insulin Was Omitted					
1	3.8	10.0	10.6	15.4	8.0	10.8	12.3	....	9.7	9.5	6.7	7.9	...	...
2	10.2	13.1	11.6	16.5	12.6	13.0	16.0	....	9.2	9.2	6.2	11.2	7.2	...
3	10.1	13.1	12.5	15.1	11.2	14.8	11.4	11.8	9.8	11.0	9.0	11.6	12.3	...
4	10.9	8.8	9.6	14.5	9.4	....	....	....	5.7	9.3	...	...	...	...
5	10.9	13.0	12.5	8.8	....	....	....	....	7.4	6.0	10.8	...	...	...
6	5.1	14.0	15.7	13.4	11.8	11.0	....	....	9.5	7.3	9.6	7.1	8.5	7.9
Aver.	8.5	12.0	12.1	13.9	10.6	12.4	13.2	11.8	8.5	8.7	8.5	9.4	9.3	7.9

* The nitrogen is recorded in grams per twenty-four hour samples of urine. The determinations were made at intervals of from one to two weeks.

The edema that appears in certain diabetic patients from water retention when insulin is first administrated is a familiar picture. It is improbable that the development of edema has anything to do with the gain in weight from insulin observed in normal individuals. The water balance was measured in seven instances. The relation between the intake and the output of fluid remained unchanged during and after insulin therapy, and in no case was there any diuresis when insulin was omitted.

THE QUESTION OF FOOD INTAKE AND ABSORPTION

That insulin increases the appetite and produces an increased ingestion of food is suggested by a study of the nitrogen excretion in the urine. During insulin

TABLE 3.—*Phenolsulphonphthalein Excretion in Thin Persons Taking Insulin* *

Case	Before Insulin Therapy	During Insulin Therapy	After Insulin Was Omitted
1	61	49	60
2	64	56	62
3	55	40	72
4	60	49	74
5	44	34	41
6	52	25	57
7	44	36	54
Average	54	41	60

* The phenolsulphonphthalein excretion is expressed in per cent of 0.006 Gm. of the dye excreted in the urine, two hours and ten minutes after its intramuscular injection.

therapy the nitrogen excretion rose considerably, and after insulin was omitted it decreased to near the original level. This occurred in spite of the fact that some of these patients continued to gain weight after the drug was discontinued and thought they were eating an abnormally large amount of food.

That insulin may help to increase the absorption and assimilation of food is suggested by a study of the phenolsulphonphthalein excretion during treatment. There was a uniform decrease of from 8 to 27 per cent in the excretion in the urine of the intramuscularly injected phenolsulphonphthalein during the period of insulin treatment and a return to the original level after the omission of insulin. It is not unreasonable to account for this finding as due to an increased excretion of phenolsulphonphthalein in the bile following the stimulation of the flow of bile by insulin. Hanner and Whipple[26] have shown that from 10 to 15 per cent of the usual dose of the dye, when injected intramuscularly as a test for renal function, can be eliminated by the liver route. As has been mentioned, the flow both of bile and of pancreatic juice, in experimental animals at least, is increased by insulin. Perhaps, therefore, insulin may actually increase absorption of food in normal individuals by its action on liver and pancreas, though, before this hypothesis can be accepted, further study is necessary. The decrease in the phenolsulphonphthalein elimination did not appear to be a result of a

TABLE 4.—*The Blood Nonprotein Nitrogen and Urea Nitrogen in Thin Persons Taking Insulin* *

Case	Before Insulin Therapy	During Insulin Therapy	After Insulin Was Omitted
	Nonprotein Nitrogen		
1	..	24	25
2	23	24	21
3	..	39	37
4	40	34	32
5	20	18	19
6	25	23	20
7	22	23	24
	Urea Nitrogen		
1	8	8	10
2	7	7	10
3	11	8	10
4	12	13	10
5	8	8	13
6	13	10	13
7	11	8	14

* The nonprotein nitrogen and urea nitrogen concentration are recorded in milligrams per hundred cubic centimeters.

decreased renal function because the blood urea and nonprotein nitrogen concentration showed no essential variation during the periods of observation, nor did albuminuria develop in the cases studied when the phenolsulphonphthalein excretion fell.

THE TONIC EFFECT OF INSULIN IN NORMAL THIN PERSONS

That insulin acts as an admirable tonic is suggested by a study of the plasma protein concentration, the red blood cell count and the circulating blood volume of

TABLE 5.—*The Plasma Protein Concentration in Thin Persons Taking Insulin* *

Case	Plasma Protein		
	Before Insulin Therapy	During Insulin Therapy	After Insulin Was Omitted
1	6.8	7.5	6.3
2	6.3	6.1	6.8
3	7.6	8.4	7.8
4	6.5	7.8	7.9
5	6.9	7.6	5.9
6	7.5	5.2	7.0
Average	6.9	7.1	6.9

* The plasma protein is recorded in grams per hundred cubic centimeters.

persons receiving the drug. The plasma protein concentration tended to increase slightly during or after the period of insulin administration.

The red blood cell count showed an increase after the administration of insulin which averaged 400,000

23. Fonseca, Fernando, and de Carvalho, Alberto: Sur le mécanisme de l'action de l'insuline sur la sécrétion gastrique, Compt. rend. Soc. de biol. **96:** 1327 (May 20) 1927.

24. Okada, Seizaburo; Kuramochi, Kwanichi; Tsukahara, Toshio, and Ooinoue, Tatsuo: Pancreatic Function: The Humoneural Regulation of the Gastric, Pancreatic and Biliary Secretions, Arch. Int. Med. **43:** 469 (April) 1929.

25. Lueders, C. W., and Watson, M. E.: The Effect of Insulin Therapy on Pancreatic Enzymes in Malnutrition, Arch. Int. Med. **49:** 330 (Feb.) 1932.

26. Hanner, J. P., and Whipple, G. H.: The Elimination of Phenolsulphonphthalein by the Kidneys, Arch. Int. Med. **48:** 598 (Oct.) 1931.

cells, and this tended to persist after the drug was omitted.

The increases in the circulating blood volume were also noted. The blood volume increased some 400 cc. on the average, or more than 10 per cent, during the period of insulin administration, the increase consisting in a proportionate growth of both plasma and corpuscles. This finding, incidentally, points against edema as having been a significant factor in the gain in weight recorded. The basal metabolic rate was unaffected by insulin or perhaps tended to be slightly decreased by it. The behavior of the basal metabolic rate is of some interest for, in diabetes at least, Campbell and Macleod [27] have demonstrated that insulin tends to increase it.

TABLE 6.—*The Red Blood Count in Thin Persons Taking Insulin* *

Case	Before Insulin Therapy	During Insulin Therapy	After Insulin Was Omitted
1	4.33	4.76	4.68
2	4.27	4.46	4.67
3	5.31	5.71	5.51
4	4.53	4.96	4.89
5	5.29	5.43	5.1
6	3.94	4.7	4.86
7	3.62	4.07	4.29
Average	4.47	4.87	4.86

* The red blood cells are expressed in millions per cubic millimeter.

THE BLOOD SUGAR LEVEL IN THIN PERSONS TAKING INSULIN

Apparently there was very little danger from insulin hypoglycemia, even though the blood sugar concentration was not elevated. This was probably due to the fact that the patients ate sufficient food to avoid reactions, or, if mild hypoglycemic symptoms appeared, the patients knew their significance and how to treat them. In one case, the blood sugar level was as low as 62 mg. fasting and 65 mg. four hours after a large noon meal before insulin treatment. In all cases the fasting blood sugar changed very little during the various periods of observation, as shown in table 9.

TABLE 7.—*The Plasma, Corpuscular and Total Blood Volume in Thin Persons Taking Insulin* *

	Before Insulin Therapy			During Insulin Therapy			After Insulin Was Omitted		
Case	Plasma	Corpuscles	Whole Blood	Plasma	Corpuscles	Whole Blood	Plasma	Corpuscles	Whole Blood
1	2,320	1,250	3,570	2,500	1,535	4,035	2,220	1,420	3,640
2	2,320	1,222	3,542	2,600	1,500	4,100	2,500	1,530	4,030
3	1,480	1,080	2,560	1,700	940	2,640	1,860	1,090	2,950
4	2,360	1,640	4,000	2,660	1,970	4,630	2,410	1,790	4,200
5	2,080	1,020	3,100	2,080	1,120	3,200	2,270	1,140	3,410
Aver.	2,112	1,242	3,354	2,308	1,413	3,721	2,252	1,394	3,646

* The volumes are recorded in cubic centimeters.

SUMMARY AND CONCLUSIONS

This paper presents a clinical study of the effect of the subcutaneous administration of insulin in nineteen healthy thin persons. Ten units of insulin, three times a day, was the standard dosage of insulin used, a few patients taking somewhat more or less than this amount, and a liberal diet was employed uniformly.

After insulin injections were started, the patients gained weight rapidly and immediately. The increase in weight tended to become less marked as the weight approached the standard normal weight. In thirteen cases after the omission of insulin the weight remained either constant or continued to increase during periods of subsequent observation, which varied from six weeks to fourteen months. Two patients lost 8 and 5 pounds (3.6 and 2.3 Kg.) of the gained weight within six months of the omission of insulin.

Insulin appeared to act as an admirable tonic, all the individuals receiving it feeling much stronger and more active than they had felt previously. Mild hypoglycemic reactions occurred rarely. Local skin hypersensitiveness to insulin appeared in six cases. This finding is striking as compared with the rarity with which skin hypersensitiveness to insulin is seen in diabetic patients receiving the drug. There were no other untoward symptoms.

The gain in weight in thin persons taking insulin is probably due to an increased intake, better digestion and increased assimilation of food. The increase in weight does not appear to be due to water retention, as may occur in certain diabetic patients taking insulin. The relation between the fluid intake and output during and after the use of insulin was not abnormal, nor did diuresis develop after the omission of insulin.

TABLE 8.—*The Basal Metabolic Rate in Thin Persons Taking Insulin* *

Case	Before Insulin Therapy	During Insulin Therapy	After Insulin Was Omitted
1	0	+ 2	+ 5
2	— 4	—10	—11
3	— 3	— 6	— 2
4	+ 8	— 4	+ 5
5	+ 5	+ 1	—11
6	—13	— 3	— 6
7	— 2	— 5	—14

* The metabolism is recorded in per cent variation from normal.

That insulin increases the appetite and produces an increased ingestion of food is suggested by a study of the nitrogen excretion in the urine. In the cases studied, the nitrogen excretion rose considerably during the period of insulin therapy and then decreased after its omission to near the previous level.

That insulin may increase the absorption and assimilation of food is suggested by a study of phenolsulphonphthalein excretion during the treatment. There was a uniform decrease of from 8 to 27 per cent in the excretion in the urine of intramuscularly injected phenolsulphonphthalein during the period of insulin treatment and a return to the original level after the omission of insulin. This was possibly due to an increased excretion of phenolsulphonphthalein in the bile as a result of the stimulation of the flow of bile by insulin, and since the flow of pancreatic juice is similarly stimulated by insulin it is reasonable to assume that increased absorption of food may occur from its employment.

TABLE 9.—*The Blood Sugar Concentration in Thin Persons Taking Insulin* *

Case	Before Insulin Therapy	During Insulin Therapy	After Insulin Was Omitted
1	111	122	102
2	62, 90	98	100
3	92	90	80
4	95	85	92
5	80	90	78
6	70	100	85
7	112	94	90

* The blood sugar concentration is recorded in milligrams per hundred cubic centimeters.

27. Campbell, W. R., and Macleod, J. J. R.: Insulin and Its Use in Diabetes, Baltimore, Williams and Wilkins Company, 1925, p. 83.

That insulin serves as an admirable tonic physiologically as well as psychologically is suggested by a study of the plasma protein concentration, the red blood count and the circulating blood volume of persons receiving insulin. The plasma protein concentration tended to increase during and after the period of insulin administration. The red blood count showed an average uniform increase of approximately 400,000 red cells, which usually persisted after the omission of insulin. The blood volume also increased perceptibly during or shortly after the use of insulin.

The basal metabolic rate was unaffected or possibly tended to show a slight decrease during or after insulin therapy.

These data record evidence to explain some of the beneficial clinical results that may be obtained with insulin in certain conditions other than diabetes. Because of its varying action on different tissues, insulin may be of considerable value in the management of properly selected cases in which it is desirable to bring about gain in weight. The use of insulin for this purpose appears to be rational and is a simple and safe form of therapy.

23 Bay State Road.

THE "NORMAL" CARBON MONOXIDE CONTENT OF THE BLOOD

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The ideal normal individual should have no carbon monoxide in his blood, but the average person under ordinary conditions is exposed so frequently to it that it is not possible to regard him as being carbon monoxide free unless procedures are employed which are suitable only for the detection of amounts known to be toxic. It is our purpose to determine to what extent carboxyhemoglobin exists in the blood of presumably normal persons as shown by a precise and delicate method. The literature reveals no record of such analyses.

CARBON MONOXIDE POISONING

An able review of carbon monoxide poisoning has been compiled by Sayers and Davenport.[1] This review traces the knowledge of "vapor" poisoning from ancient times, lists the sources of carbon monoxide in industry, discusses public and private hazards, portrays the symptoms of poisoning, describes aids to diagnosis and laboratory methods, depicts the pathology of carbon monoxide poisoning, establishes standards of safety, considers preventive measures and methods of treatment, and concludes with a complete bibliography. It is therefore pointless to present comment on the literature here, although it must be noted that our interest lies in concentrations of carbon monoxide smaller than can be detected by methods advocated and used by Sayers. To our knowledge, only two reports have been made on blood approaching concentrations which might be regarded as normal for civilized man. In both instances the persons tested were exposed to obvious sources of carbon monoxide.

From the Chemical Laboratory of the Pathological Department, Bellevue and Allied Hospitals, and the Office of the Chief Medical Examiner and from the Department of Biochemistry, New York Post-Graduate Medical School of Columbia University, New York.

1. Sayers, R. R., and Davenport, S. J.: Pub. Health Bull. 195, March, 1930.

Farmer and Crittenden [2] examined the blood of steel mill operatives at the end of a working day, again in the morning as they reported for work, and finally at 4 p. m. that same day. Their results are shown in table 1.

Pilaar,[3] using his modification of the Tervaert method for carbon monoxide, reports nineteen cases in which exposure to carbon monoxide was dependent on driving a car, riding as a passenger, or tinkering with an idling engine. His results vary from negative (two cases) to 1.8 volumes per cent carbon monoxide in the blood. Inadequate ventilation, mechanical defects and the like in motor vehicles are responsible for severe cases of carbon monoxide poisoning. The analyses reported by Pilaar, however, are of definite value in showing the amount of carbon monoxide that may be picked up in "satisfactory" motor contacts.

The persons used as normals in the present investigation were selected at random, effort being made simply to see that they had not been exposed to carbon monoxide just previous to the taking of the blood. When higher results were obtained than were expected, experiments were run on tobacco smoke as the most probable cause of the excess. The literature was then examined for confirmation of the results.

Since the slow combustion of vegetable matter usually releases carbon monoxide, Le Bon's [4] observation that tobacco smoke contained this gas is not surprising. Dudley [5] believed that the heart and nerve disorders were not due to nicotine but to carbon monoxide. Amerson [6] considered that only the inhalation of carbon monoxide from tobacco smoke was dangerous. Jacoby [7] regarded the carbon monoxide as being as dangerous as the nicotine. Much of the older work is stated briefly by Pierre Schrumpf-Pierron [8] either in the text or in the comprehensive annotated bibliography. Jacob Meyer found that 1 Gm. of tobacco produced 82 cc. of carbon monoxide. Wahl's [9] analyses showed that tobacco

TABLE 1.—*The Blood of Steel Mill Operatives*

Time	Percentage of Carbon Monoxide Bound by Hemoglobin
4 p. m.	6.26 (average)
8 a. m.	2.11 (0.3-5.0)
4 p. m.	7.01 (average)

smoke contains from 1.5 to 4.0 per cent of carbon monoxide and that the smoke expelled contained from 0.7 to 1.2 per cent. From the work of Marcelet [10] it would appear that 1 Gm. of cigaret tobacco produces from 20 to 80 cc. of carbon monoxide, whereas pipe tobacco yields from 53 to 109 cc. As quoted by Schrumpf-Pierron, Marcelet asserts that "a smoker who consumes daily 20 Gm. of tobacco in cigaret form absorbs from 400 to 1,600 cc. of carbon monoxide. If the same quantity of tobacco is smoked in a pipe, the dose becomes larger—about 1,600 to 2,200 cc. Fleig,[11] on the other hand, considers the amount of carbon monoxide, particularly the amount which the smoker

2. Farmer, C. J., and Crittenden, P. J.: J. Indust. Hyg. **11:** 329 (Dec.) 1929.
3. Pilaar, W. M. M.: J. Biol. Chem. **83:** 43 (July) 1929.
4. Le Bon, G.: La fumée du tabac, Paris, 1872; Recherches chimiques et physiologiques, ed. 2, 1880.
5. Dudley, W. L.: M. News **53:** 286, 1888.
6. Amerson, S. S.: Kentucky M. J. **5:** 29 (Aug.) 1907; abstr., J. A. M. A. **49:** 625 (Aug. 17) 1907.
7. Jacoby, G. W.: New Yorker med. Monatschr. **9:** 65, 1897.
8. Schrumpf-Pierron, Pierre: Tobacco and Physical Efficiency: A Digest of Clinical Data, New York, Paul B. Hoeber, Inc., 1927.
9. Wahl, F.: Arch. f. d. ges. Physiol. **88:** 262 and 286, 1899.
10. Marcelet, H.: Sur le dosage de l'oxyde de carbone, en particulier dans les fumées de tabac, Montpellier thesis, 1907.
11. Fleig, C., and de Visne, P.: L'oxyde de carbone intervient-il dans l'intoxication par la fumée du tabac? Compt. rend. Acad. d. sc. **146:** 776, 1908.

actually absorbs, so small as not to play an appreciable part in chronic tobacco poisoning."

According to Toth,[12] 10 Gm. of tobacco yield from 2 to 3 cc. of carbon monoxide. Baumberger,[13] using more precise methods, reports that cigarets produce about 8.3 cc. per gram of tobacco smoked. In his opinion, about 61 per cent of the carbon monoxide is absorbed by inhalers. Baumberger, as quoted by Dixon,[14] states that from 7.2 to 25 parts of carbon monoxide in 10,000 of air exist in the mouth of the cigaret smoker. There is, however, little or no absorption of carbon monoxide from the mouth. Hartridge,[15] asserts that there may be a 6 per cent saturation in the blood of a moderate cigaret smoker. Armstrong[16] ascertained the concentration of carbon monoxide in tobacco smoke under conditions simulating smoking to be: cigaret smoke, from 0.5 to 1.0 per cent; cigar smoke, from 6.0 to 8.0 per cent; pipe smoke, from 1.0 up. The amount of carbon monoxide that reaches the smoker's mouth depends on the manner and rate of smoking as well as on the packing of the tobacco. Jones, Yant and Berger[17] carried out rigorous smoking tests under conditions ordinarily not tolerated. Unfortunately, they employed a method (pyrotannic acid) which is not accurate for the concentrations of carbon monoxide that they encountered. The thoroughness of the experiments conducted by the Bureau of Mines was worthy of a precise analytic treatment. They did not find the carbon monoxide content of the blood to exceed 5 per cent saturation. They present analyses of air from cigaret smokers who inhaled (table 2). They found that the average volume of smoke taken into the mouth and lungs during inhalation averaged for twenty-five draws about 60 cc. (range from 40 to 80 cc.). Persons smoking and inhaling as they worked were unknowingly observed. From the data given in table 3 it will be seen that from 60 to 90 cc. of smoke per minute is taken into the lungs. Breathing at the rate of 6 liters per minute, the concentration of carbon monoxide can seldom reach 0.01 per cent in the alveoli of the lungs. Assuming that there are periodic intervals when the content approaches 0.02 per cent, Jones and his associates feel that the carbon monoxide absorbed from tobacco smoke is negligible.

TABLE 2.—*Percentage of Carbon Monoxide in Exhaled Air*

First Portion	Second Portion	Last Portion
0.05	0.03	0.005 or less
0.03	0.03	0.005 or less

The normal healthy adult shows no carbon monoxide symptoms until from 15 to 20 per cent of the hemoglobin is not functioning as a carrier of oxygen. Dixon,[14] however, notes that certain cigaret smokers exhibit symptoms of mild carbon monoxide poisoning, presumably an idiosyncrasy. It is quite probable that headaches experienced by heavy smokers are due in part to the inhalation of carbon monoxide.

Bogen[18] collected and analyzed all the smoke and fumes from burning tobacco. Figures are given for mainstream smoke (that drawn through into the mouth) and sidestream smoke (that escaping from the end). The sidestream smoke is rich in carbon dioxide and is alkaline because of its ammonia content. The mainstream smoke is acid and rich in carbon monoxide. The more rapid the smoking, the greater the concentration of carbon monoxide.

From the literature it would appear that tobacco smoke might be a prominent factor in determining the "normal" level of carbon monoxide in the blood. It is highly desirable that a large number of these "normal" values be accumulated so that we may the better evaluate analyses made in industrial cases. This paper is only a step in that direction.

TABLE 3.—*Inhalations of Smokers at Work*

Total Number of Inhalations	Time	Total Number of Respirations
12	11 minutes	153
12	8 minutes	118

EXPERIMENTAL

The methods for the quantitative determination of carboxyhemoglobin fall into two groups: (1) those expressing only the relative content, the percentage of hemoglobin combined with carbon monoxide, and suited only for the detection of fairly large amounts of carbon monoxide; (2) those ascertaining the absolute quantities of carbon monoxide as released and measured under standard conditions of pressure and temperature; these methods are suited to the determination of small amounts of carbon monoxide. The results are expressed in cubic centimeters of carbon monoxide, measured at 0 C and 760 mm., released from 1 cc. or 100 cc. of blood. These figures may be converted into percentage of hemoglobin combined with carbon monoxide by the following procedure: The total hemoglobin of the blood in terms of grams per hundred cubic centimeters is determined. Since 1 Gm. of hemoglobin combines with 1.34 cc. of carbon monoxide under standard conditions, the hemoglobin found, multiplied by 1.34, will give volumes per cent of carbon monoxide if the blood is completely saturated with the gas.

$$\frac{\text{Volumes per cent CO found}}{\text{CO capacity}} \times 100 = \text{percentage of hemoglobin saturated.}$$

The carbon monoxide capacity may be determined experimentally by saturating the blood with carbon monoxide. The calculated value has been shown by Farmer and Crittenden[2] to correspond well with that obtained by analysis.

The Van Slyke and Robscheit-Robbins[19] method was selected as the best suited to our purpose since the accuracy of the method is given as from 0.02 to 0.03 per cent. We found our error with this method not to exceed 0.04 per cent on analysis of twelve known specimens and on duplicate analyses of unknown specimens.

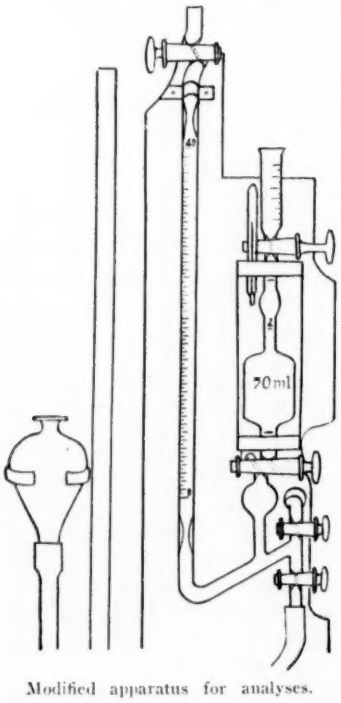
Collection and Preservation of Blood for Carbon Monoxide Determinations.—The most satisfactory anticoagulants are 0.2 per cent potassium oxalate and 0.3 per cent sodium fluoride. With any anticoagulant there is a gradual darkening of the blood on standing. It is most marked with oxalate. There is a slight drop in the carbon monoxide content with oxalate; this is

12. Toth: Chem. Ztg. **31**: 98, 1907.
13. Baumberger, J. P.: J. Pharmacol. & Exper. Therap. **21**: 23 (Feb.) 1923.
14. Dixon, W. E.: Lancet **2**: 881 (Oct. 22) 1927.
15. Hartridge, H.: Proc. Phys. Soc., Jan. 31, 1920.
16. Armstrong, H. E.: Brit. M. J. **1**: 992 (June 24) 1922.
17. Jones, G. W.; Yant, W. P., and Berger, L. B.: Bureau of Mines Reports of Investigations 2539, October, 1923.
18. Bogen, Emil: The Composition of Cigarets and Cigaret Smoke, J. A. M. A. **93**: 1110 (Oct. 12) 1929.
19. Van Slyke, D. D., and Robscheit-Robbins, F. S.: J. Biol. Chem. **72**: 39 (March) 1927.

accentuated by the presence of air. Fluoride is not open to this objection.[20]

A Modified Apparatus.—The small and much less expensive apparatus made to our sketch by Eimer and Amend consists of a 40 cm. manometer, Van Slyke-Neill chamber with a Harington trap, a Shohl trap, and an outlet to the leveling bulb, all mounted on a board hinged at the base so as to make shaking by a motor possible. The whole apparatus, excluding the motor, cost somewhat less than $60. The motor in use is an old one, the parts of which were found lying round the laboratory, but which has been made to function very well.

This apparatus was the result of a description of a modified Van Slyke oxygen apparatus, seen in Dr. Shohl's laboratory by Dr. John A. Killian. The only important difference lies in the Harington trap and in the introduction of certain constrictions in the glassware to break the force of the mercury in its movements. On this apparatus all determinations possible with the regular Van Slyke apparatus can be satisfactorily carried out. The advantages of the modified Van Slyke apparatus include the decreased cost, the ready portability and the increased speed in working, owing to the fact that oscillation of the mercury at the time of taking pressure readings is practically negligible. Its disadvantages are the shorter manometer (40 instead of 60 cm.) without illuminated background and without provision for a distilled water reservoir as part of the apparatus. The longer manometer is required only for very high concentrations of carbon monoxide. Ingenuity can take care of the other disadvantages.



Modified apparatus for analyses.

The modified apparatus was not employed for the analyses on normal blood reported in this paper with one or two exceptions. It was used chiefly for rendering the necessary solutions air free, which was a great saving of time. The time required for the actual test, once the solutions are air free, is about forty-five minutes. Preparing the solutions and making the apparatus ready for the test may, and usually do, consume hours. Four hours from start to finish of a single test may be regarded as very good time indeed. The time given by Van Slyke for the test is thirty minutes.

Comparison tests run on the two machines are shown in table 4. The only other comparison test run was on the modified apparatus with the normal pooled blood shown. It was ruled out as being unsatisfactory because air had to be admitted to the Harington trap to dislodge material that was clogging the discharge outlet. The blood mixture was kept in the chamber without a mercury seal during the cleaning. The test was then resumed; the result was 0.34 volumes per cent.

Since we wished to compare results on the two types of apparatus, it was decided that the 2 cc. mark should be used for all tests. We felt that this would be necessary on account of the short manometer. From the comparison figures given, it will be seen that the 40 cm. manometer can easily be used even for high carbon monoxide values such as are rarely encountered in the laboratory.

TABLE 4.—*Comparison Tests Run on Two Machines*

Blood	Regular Van Slyke Apparatus	Modified Apparatus
Pooled, gassed	8.53 volumes per cent	8.51 volumes per cent
Pooled, normal	0.22 volumes per cent	0.25 volumes per cent

The original directions for the method call for the 0.5 cc. mark unless the pressure is over 400 mm. It was found in preliminary tests made for acquiring technic that as good checks were not obtained as expected. In examining all possible sources of error, it was decided to try reading at both levels on each test. The results are found in table 5. It is quite apparent that carbon monoxide breaks away from the cuprous chloride in expanding the gas volume from 0.5 to 2.0 cc. and that it is not permissible to take readings at 2 cc. except when absolutely necessary.

Blank Tests.—Two blank determinations were run at different times on the regular Van Slyke apparatus, cooled boiled water being substituted for the blood. The calculations for these follow:

$$(10(18.1 - 18.3) + 2.0)F_{CO} = 0$$
$$(10(11.3 - 11.5) + 2.0)F_{CO} = 0$$

Similar tests run on the modified apparatus gave on one occasion a difference of —0.42 and —0.43 cm., read at the 0.5 and 2.0 cc. marks, respectively, and on another occasion —0.38 cm. for both gas volumes. In the first instance sufficient of the glycerol-salt and cuprous chloride solutions were left over so that 5 cc. could be introduced into the regular Van Slyke apparatus and the difference in vapor tension noted. This difference was found to be 0.22 cm. It would appear that a correction of 4 mm. is required when the modified apparatus is used.

TABLE 5.—*Carbon Monoxide Content Calculated from Pressure Readings at Different Volumes on the Same Specimen at Practically the Same Time*

Specimen	0.5 Cc. Volumes per Cent	2.0 Cc. Volumes per Cent
L. K.	0.22	0.18
O. P.	0.27	0.20
A. K.	0.19	0.13
A. O.	0.23	0.14
H. W.	0.27	0.10
A. G.	0.16	0.14
M. P.	0.22	0.17
Average	0.22	0.15

EXPERIMENTAL STUDIES

Several groups of persons were selected for study of the carbon monoxide content of the blood. The first group, shown in table 6, were taken at random and considered to be normal as far as carbon monoxide was concerned.

20. Sayers, R. R.; O'Brien, H. R.; Jones, G. W., and Yant, W. P.: Pub. Health Rep. **38**: 2005 (Aug. 31) 1923.

It will be recognized that the subjects of table 6 represent those living under urban conditions but exposed to minimal amounts of carbon monoxide. Higher figures would be expected of persons on the street, in motor vehicles, in kitchens, or in rooms with gas heaters. Further comment will be made later on these cases, particularly the high ones. It is of interest, however, to compare these results with those obtained in two taxi drivers who had consulted physicians because of "symptoms."

Specimens were obtained from Kings Park State Hospital, Long Island, for comparison with city dwellers. The results are given in table 8.

The results shown in table 8 were nowhere as low as we had expected. Unfortunately, it has been impossible for us to control the conditions under which the blood was taken or even to ascertain what those conditions were. To explain these figures, a critical examination of technic was made and all possible sources of carbon monoxide were looked into.

TABLE 6.—*Persons Living in New York City*

Subject	Hemoglobin, Gm. per 100 Cc.	Carbon Monoxide Found Volumes per Cent	Carbon Monoxide Capacity Volumes per Cent	Hemoglobin Saturation, per Cent	Comment
A. A.	....	0.07	.....	....	Garage mechanic in hospital a week, complaint carbon monoxide poisoning
H. T.	14.6	0.73	19.56	3.2	Laboratory worker after three hours walk on sunny day on city streets; traffic moderate
M. P.	14.2	0.22	18.03	1.22	Gynecologic patient in hospital two days
P. B.	12.8	0.31	17.1	1.81	Child, aged 4 years; pancreatitis; lives in country; came to see doctor by railroad and taxi; blood taken at once
P. A.	....	0.22	.....	....	Patient in clinic for diagnosis
T. W.	15.3	0.49	20.5	2.4	Diabetic surgical patient in hospital several days, on floor above continuous traffic
C. Z.	12.1	0.57	16.2	3.5	Patient arriving in laboratory for sugar tolerance test
S. K.	13.0	0.24	17.42	1.37	Patient in hospital overnight for tolerance test; morning blood
A. G.	....	0.16	.....	....	Patient in hospital overlooking Central Park for two weeks
L. X.	16.0	0.22	21.44	1.02	Surgical case in hospital two days
A. K.	14.2	0.19	19.03	1.0	Surgical case; thyroid; prior to operation
A. B.	....	0.04 0.00	.....	....	Patient coming to laboratory for blood test; duplicate analysis
A. S.	....	0.25	.....	....	Clinic patient
F. S.	15.0	0.04 0.00	20.10	0.19	Surgical case in hospital one week; duplicate analysis
J. M.	18.6	0.36	24.92	1.04	Visitor to laboratory; on arrival
J. M.	18.4	0.30	24.65	1.02	Same as preceding, on different day
C. M.	15.3	0.22	20.05	1.07	Blood taken on admission to hospital for surgical treatment
A. S.	15.3	0.84	20.05	4.1	Patient in hospital three days for diagnosis
Average.....		0.27			

In one instance, H. W., it was decided to take pressure readings at both the 0.5 and 2 cc. gas volumes. The result by getting the 0.5 cc. level promptly was 0.27 volumes per cent of carbon monoxide. On immediately dropping to the 2 cc. mark, the carbon monoxide was found to be 0.10 per cent. By successively reading at the two levels, progressively lower values were obtained. Finally the mercury was dropped to the 50 cc. mark and the apparatus shaken by hand for a few seconds. Rising at once to the 2 cc. level gave a reading for P_2 2.2 mm. greater than P_1, which is negative for carbon monoxide. Elevation to the 0.5 cc. mark resulted in a carbon monoxide of 0.04 per cent, which approaches the error of the method. This behavior would seem to indicate that the gas combined with the cuprous chloride was carbon monoxide.

There appeared to us to be two ways in which these persons living in the country might themselves produce carbon monoxide: (1) in the gastro-intestinal tract, and (2) by inhaling tobacco smoke. Experiments were carried out in both directions, and the results are interesting if not conclusive.

Proof that the intestinal tract is not the site of formation of minute, though perhaps constant, amounts of carbon monoxide would be rather difficult and is entirely beyond the scope of this paper. Circumstances, however, placed at our disposal an unusually active strain of Bacillus welchii taken from an abdominal wound of a patient in the hospital. This organism was grown on dextrose broth. Boiled milk in a large test tube (from 80 to 100 cc.) was inoculated with this culture. A sterile 2 mm. glass tube was inserted just below the level of the milk, a petrolatum seal was poured in and the test tube plugged with cotton. The glass tubing had previously been bent to form a V so that the other end could be inserted into a small test tube (20 cc.) containing from 6 to 7 cc. of blood. The tubing ended just below the level of the blood. The tubing had been fitted with a cork so that the test tube could be well closed off. It was sealed with collodion because the incubator used was gas heated and any exposure of the blood to the air there would have interfered with the test. The culture was incubated at 37 C. for twelve hours. During that time about 50 cc. of gas was produced. This was bubbled over into the blood by placing the culture tube in a hot water bath (steam heated), the cork in the blood tube being loosened. The gas expanded and passed over; this was assisted by the melting of the petrolatum plug, which gradually fell to the milk level. The gas was driven over at about a bubble a second. The blood had been previously analyzed for carbon monoxide, the result being 0.17 volumes per cent. The exposed blood showed a carbon monoxide content of 0.21 volumes per cent. It must be borne in mind that

TABLE 7.—*Taxi Drivers (New York City)*

Driver	Carbon Monoxide Found, Volumes per Cent	Hemoglobin Saturation, per Cent	Comment
M. M.	4.33	19.0	
M. E.	1.94	10.5	2/ 3/31
	1.93	10.5	2/11/31
	3.13	17.0	2/18/31
	1.47	8.0	3/11/31

TABLE 8.—*Persons Living in the Country*

Subject	Carbon Monoxide Found, Volumes per Cent	Carbon Monoxide Capacity, Volumes per Cent	Hemoglobin, Gm. per 100 Cc.	Hemoglobin Saturation, per Cent
I. B.	0.14	21.71	16.2	0.64
S. C.	0.17	24.49	18.2	0.69
A. C.	0.17	24.12	18.0	0.70
S. A.	0.10	20.37	15.2	0.49
S. F.	0.32	22.78	17.0	1.40
F. H.	0.09	22.09	16.5	0.40
S. S.	0.17	21.44	16.0	0.79
J. C.	0.61	21.57	16.1	2.82
F. R.	0.16	18.09	13.5	0.88
H. W.	0.27	19.16	14.3	1.40
J. F.	0.64	17.69	13.2	3.61
N. M.	0.13	18.22	13.6	0.71
Average.....	0.24			

the incubated blood, as judged by its color change, had undergone some decomposition as a result of the heat. The increase of 0.04 per cent is of little significance since it is practically within the limits of experimental error given by Van Slyke for the method (from 0.02 to 0.03 per cent).

While B. welchii cannot be taken as typical of organisms found commonly in the intestinal tract, the chance to examine the gas formed by it was not to be ignored. Several bacteriologists consulted were of the opinion that carbon monoxide was not produced in the intestinal tract. While the chief gases formed are undoubtedly carbon dioxide, hydrogen, hydrogen sulphide and nitrogen, it is known that small amounts of other gases are released, and it is at least conceivable that a trace of carbon monoxide, though hardly more, may be present. It was suggested that meat broth might be a more suitable medium for producing carbon monoxide under bacterial action. We feel justified, however, in assuming that carbon monoxide absorbed from the gastro-intestinal tract cannot account for the unexpectedly high values encountered in table 8.

It seemed much more likely to us that tobacco smoke would contain sufficient carbon monoxide to produce detectable amounts of carboxyhemoglobin. The possibility was tested out by exposing blood to cigaret smoke. A 10 cc. graduated pipet was cut off so as to form a cigaret holder about 7 inches long. This was connected by the smallest amount of rubber tubing to a 250 cc. gas-washing Drexel bottle (tall form with ground-glass stopper), and this in turn to a tall cylinder (125 to 150 cc.) fitted with a bulb-end aerating tube (part of the nitrogen aerating apparatus) which contained from 18 to 20 cc. of blood. Air was drawn through this as slowly as possible. The distance from the cigaret to the blood was greater than that from the mouth to the lungs. The tobacco oil and tar settled to a large extent in the pipet holder and Drexel bottle. The same blood was used for this experiment as for the bacteriologic one. The control blood and aerated specimen were analyzed on the same evening, sufficient glycerol-salt and cuprous chloride solutions having been rendered air free at the start so that these solutions would be identical in the two analyses. The exposed blood showed a concentration of carbon monoxide of 0.63 volumes per cent as compared to the control figures of 0.17 per cent. Hemoglobin determinations were made on both to be certain that the blood was properly mixed before separation. Two tests were made with the "smoking apparatus" to see whether ammonia was present in interfering amounts. Nessler's solution gave no change in color.

As a result of this experiment, the literature was examined for observations on the carbon monoxide content of tobacco smoke. Our suspicions were amply confirmed.

Nothing is known regarding the tobacco factor in the analyses reported in tables 6, 7 and 8 except in three instances. H. T. (0.73 volumes per cent) later recalled having consumed five cigarets during his three hours' walk. J. M. was suffering from overindulgence in tobacco and was under the doctor's orders to smoke very little. He had had a cigaret about two hours previous to the finding of 0.36 volumes per cent in his blood. He returned at a later date for another test. Unfortunately, as he reached the laboratory, he encountered some one he especially wished to see. They conversed for some minutes in a small room while the friend busily smoked a cigar. The blood finding on the outsider was 0.30 volumes per cent. He was then sent out on the roof (sixth floor) to smoke a cigar. After about half an hour his carboxyhemoglobin was 0.35 volumes per cent. The blood of A. S. had been selected at random from a basket of routine specimens for a demonstration of the carbon monoxide test. When the blood was found to contain 0.84 volumes per cent, the patient's chart was examined and no information of value obtained. On questioning, the patient, who had been in the hospital for three days, admitted that just before his blood had been taken he had had a cigaret. It will be seen that the two highest values reported in table 6 were obtained on blood from persons known to have been smoking shortly before the blood was taken.

We then attempted to discover under what conditions the persons reported in table 8 worked and lived. The information obtained is given in table 9.

TABLE 9.—*Occupation and Exposure to Smoke of Persons Reported in Table 8*

Subject	Carbon Monoxide Found, Volumes per Cent	Occupation; Exposure to Tobacco Smoke
I. B.	0.14	Working in ward for six weeks; smokes two packs of cigarets a week
S. C.	0.17	Working on lawn squad for six months; never smokes
A. C.	0.17	Cutting grass for three months; smokes a pack of cigarets a day, if he has opportunity
S. A.	0.10	Working in ward for two weeks; smokes a pipe or cigarets continuously, lighting one cigaret with previous one whenever he has the chance; smoking not allowed in ward
S. F.	0.32	Working in ward three months, also in occupational therapy class; smokes pipe three or four times daily and oftener if he has opportunity
F. H.	0.40	Working in ward nearly six months; does not smoke and does not go out when others go out for a smoke; this ward is close to power house and, if the wind is right, smoke reaches the ward
S. S.	0.17	Works on boulevard keeping road in repair; does not smoke, but associates with smokers
J. C.	0.61	Working in laundry for six months; smokes pipe at every opportunity and usually carries it in his mouth even when he is not smoking
F. R.	0.16	Working on lawn squad for two weeks; smokes more than a pack of cigarets a day; smokes constantly during day when he can
H. W.	0.27	Working in ward for two weeks; cigarets, four or five daily
J. F.	0.64	Working in linen room for three weeks; pack of 20 cigarets lasts two and a half days
N. M.	0.13	Works in occupational therapy class; is mute; does not smoke; may be exposed at times, but not often

There is no consistent variation of the carbon monoxide concentration of the mental cases reported in table 9. Obviously the amount of carbon monoxide in the blood is a continually varying figure and dependent largely on the immediate surroundings, since on exposure to pure air it rapidly leaves the blood. These specimens were obtained early in the morning at a time when an occasional smoker might have just finished a cigaret, whereas a confirmed smoker may have had nothing since the night before. Table 9 emphasizes the necessity of knowing precisely to what the individual has been exposed at the time the blood is taken; otherwise, it is impossible to evaluate the results.

It was felt that the best way to determine approximately how much carbon monoxide was picked up by the pedestrian on a city street was to examine the blood of street cleaners as they quit work at the end of the day. These are superior to traffic policemen in that they are on the edge of the traffic, not in the middle of it. Twelve men reported to the laboratory (Second Avenue at Twentieth Street) as they came off duty

(from 3:30 to 4:30 p. m.) after having been on the streets since 6:30 in the morning. Some came without changing their uniforms. While the ideal thing to do would be to take the blood from the men on the street, such a procedure has several drawbacks. The men cooperated very well and answered all questions put to them without reservation. The results are shown in table 10.

The average for this group of men is considerably greater than that of any other tested by us. It is worth noting, however, that the lowest values are shown by nonsmokers or by those smoking a pipe early in the day. J. M., whose carboxyhemoglobin is scarcely above the average of those at Kings Park Hospital, Long Island, works on an avenue with an elevated railway over it, where the traffic is reasonably dense and composed largely of trucks, which produce more carbon monoxide than pleasure cars. This man had less than a block to walk from his work to the laboratory. He came in his working clothes. Consequently, we have every reason to believe that he, of all the street cleaners, should show the greatest amount of carbon monoxide in his blood if the chief source of it is motor traffic. On the contrary, he has the lowest carboxyhemoglobin of the group. The one man who had not yet been on duty, J. H. G., shows more carbon monoxide, 0.77 per cent, than the average for the group, 0.69 per cent. The actual route he took to the laboratory from the Bronx was as follows: subway to Thirty-Third Street, walked to Twenty-Eighth Street and Tenth Avenue, checked in, walked to Sixth Avenue, and took trolley car to within a couple of blocks of the hospital. During the time he walked, he consumed six cigarets. It will be seen that his blood contains three times as much carbon monoxide as a man who had spent his whole day on the street but had not smoked. From this we are inclined to believe that smoking is apt to be the most conspicuous factor in determining the carboxyhemoglobin of an individual under normal conditions when he is not exposed to obvious high percentages of carbon monoxide.

TABLE 10.—*Persons Working on New York City Streets*

Subject	Carbon Monoxide Found, Volumes per Cent	Hemoglobin, Gm. per 100 Cc.	Hemoglobin Saturation, per Cent	Location and Type of Work
J. C.	0.89	15.4	4.3	Times Square; routine; smokes pipe, cigars, cigarets; smoked on way over
J. M.	0.25	15.8	1.2	1st Ave., 14th-20th St.; routine; does not smoke
J. H. G.	0.77	16.6	3.0	Came from Bronx after 10 hours sleep, going on duty; smoked six cigarets on way to laboratory
M. G.	0.28	16.1	1.3	E. 30th St.; routine; smoked pipe in morning
J. G.	0.64	16.0	3.0	54th St., 10th-11th Ave.; supervised men cleaning off empty lot; smokes 15-20 cigarets a day; smoked on way over
J. V.	0.80	15.2	4.0	42d St., 1st-2d Ave.; routine; smokes about ten cigarets a day; smoked on way over
J. C.	0.37	13.9	2.0	W. 34th St.; routine; smoked pipe in morning
M. O'C.	1.44	15.5	6.9	31st-34th St., 6th Ave., W.; worked at loading truck, engine running; smokes 20 cigarets a day; had two while waiting in laboratory to have his blood taken (by request)
E. N.	0.70	15.2	3.4	33d St., 9th-11th Ave.; routine; smokes pipe, cigars; smoked half a cigar just before taking of blood (by request)
S. G.	0.92	13.7	5.0	E. 47th St.; routine; smokes 10 cigarets a day; none for hour before taking test
J. R.	0.29	15.3	1.4	W. 7th St.; routine; does not smoke
J. J. M.	0.89	15.4	4.3	42d-46th St., 8th Ave.; routine; smokes 15-18 cigarets a day, also pipe; smoked cigaret on way over
Average	0.69			

SUMMARY

1. The average content of carbon monoxide in the blood of eighteen persons living in New York City under conditions of minimal exposure was found to be 0.27 volumes per cent. This represents about 1.0 to 1.5 per cent of the hemoglobin combined with carbon monoxide.

2. The average content of carbon monoxide in the blood of twelve persons confined to a state institution in an ideal rural locality was found to be 0.24 volumes per cent. Most of these showed a hemoglobin saturation of less than 1 per cent.

3. The average content of carbon monoxide in the blood of twelve New York City street cleaners was found to be 0.69 volumes per cent. This represents about 3 per cent saturation of the hemoglobin with carbon monoxide.

4. Two taxicab drivers were found to have on several occasions a carbon monoxide content ranging from 1.47 to 4.33 volumes per cent. This represents a hemoglobin saturation of 8.0 to 19.0 per cent.

5. Tobacco smoking appreciably increases the carbon monoxide in the blood and cannot be ignored in the interpretation of laboratory results.

303 East Twentieth Street.

ACCIDENTAL SODIUM FLUORIDE POISONING

REPORT OF EIGHT CASES, WITH ONE FATALITY

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Sodium fluoride is widely employed as an insecticide. It is the chief constituent of most "roach powders." It is dispensed in drug stores, grocery stores and department stores without any indication that it is a deadly poison. Because it is dispensed in containers similar to those used for saline laxatives or baking powder, it is often mistaken for these substances, with disastrous results. Insecticides containing sodium fluoride are commonly stored in medicine cabinets or kitchen cupboards.

It is apparent that considerable ignorance exists among druggists and laymen in general regarding the toxic properties of sodium fluoride. Many physicians do not appreciate the importance of this problem, largely because of the scant information contained in modern textbooks relative to the toxicology of sodium fluoride. Furthermore, the statements contained in some standard textbooks are incorrect, in the light of present knowledge. The 1923 edition of one widely used textbook on toxicology[1] states: "In man no fatality from sodium fluoride has been reported." The paucity of reports in medical literature does not necessarily indicate that fluoride poisoning is of infrequent

From the Diagnostic Laboratories of the Miami Valley Hospital.

1. Peterson, F.; Haines, W. S., and Webster, R. W.: Legal Medicine and Toxicology, ed. 2, Philadelphia, W. B. Saunders Company **2**: 171, 1923.

occurrence. Because of the general misconception regarding the toxic properties of sodium fluoride it seems quite probable that many cases of accidental poisoning with this compound have passed unrecognized.

Our purpose in this communication is to report eight cases of accidental acute sodium fluoride poisoning which were encountered in the Miami Valley Hospital within a period of one month. One patient died; the other seven recovered. The fatality resulted from the accidental substitution of roach powder for epsom salt. The epsom salt and the sodium fluoride containers were almost identical in appearance and size and had been placed side by side in the medicine cabinet. The seven nonfatal cases occurred in one family in which roach powder was accidentally substituted for baking powder in the preparation of biscuits.

Stanton and Kahn,[2] in 1915, described what they regarded as the first reported instance of sodium fluoride poisoning. A baby, aged 19 months, swallowed some of "Peterman's Roach Food," which contained from 40 to 50 per cent of sodium fluoride; the early recognition of the source of the child's resulting illness and the early institution of gastric lavage with large quantities of lime water and calcium chloride resulted in a favorable outcome. In 1899, Herbert B. Baldwin,[3] a chemist, reported on the toxic action of sodium fluoride. He told of the accidental substitution of roach powder for baking powder in the preparation of pancakes. The pancakes were eaten for breakfast by six or seven persons. All ate sparingly of the pancakes except one man, who ate three or four of them. All who had eaten the pancakes vomited within from five to fifteen minutes; the man who ate the largest number of pancakes died early in the evening of the same day. Criminal poisoning was suspected until it was discovered that a box of roach powder occupied a position adjacent to a box of baking powder in the cupboard. Sufficient sodium fluoride was recovered from the tissues to etch strongly a piece of glass. While carrying out the chemical investigations of these cases, Baldwin learned of an almost identical accident in another city, in which sodium fluoride was accidentally substituted for baking powder in preparing wheat cakes. The four persons who ate the wheat cakes experienced nausea, vomiting, intestinal cramps and, in one instance, persistent diarrhea. After several days of prostration, all recovered. Baldwin mentions another case of a man who, while intoxicated, mistook sodium fluoride for Rochelle salt (potassium and sodium tartrate); violent vomiting and purging followed, but the patient recovered within a few days.

Schyzzer,[4] in 1901, recorded an instance of acute fluoride poisoning in a man, aged 38, who had consumed large quantities of beer containing sodium fluoride; fluoride was recovered from the urine and blood. Hickey,[5] in 1911, reported the death of a 10 year old girl who was given one teaspoonful of sodium fluoride, which had been mistaken for Rochelle salt; the girl died in one hour. Hickey also describes two instances of sodium fluoride poisoning in a man and wife who were severely poisoned following the ingestion of what was thought to be Rochelle salt. Chemical analysis of the Rochelle salt revealed the presence of large amounts of sodium fluoride. Further investigation showed that the poison was obtained from an artists' supply store. Two barrels were found in the same room, one containing sodium fluoride and the other Rochelle salt. Vallée[6] recorded the poisoning of a family of seven persons who had eaten pastry containing sodium fluoride; all recovered.

In 1923, Bizot[7] reported a fatal case of sodium fluoride poisoning in a man who had taken a teaspoonful of the compound, mistaking it for Rochelle salt. He experienced severe epigastric pain within five minutes, followed immediately by severe vomiting, diarrhea and prostration. He was given a glassful of lime water with immediate temporary relief of the gastro-intestinal symptoms, but he continued for some time to have painful spasmodic contractions of the arms and legs. Two and one-half hours after the ingestion of the sodium fluoride the stomach was washed with lime water; the symptoms were again relieved. Nine hours after the ingestion of the compound the patient suddenly died.

McNally[8] reported the deaths in three accidental cases and one suicidal case in Chicago, following the ingestion of sodium fluoride. One woman used an unknown amount of roach powder in place of starch in the preparation of an omelet; she died during the evening of the same day. Necropsy revealed multiple small hemorrhages in the congested and edematous gastric mucosa. Chemical analyses revealed the presence of sodium fluoride in the tissues. Two sisters mistook sodium fluoride for a laxative powder; one died four hours after the poison was taken. The other sister took some of the same powder as a laxative some six weeks after the death of her sister. Death occurred in three quarters of an hour. The body of the first sister was exhumed and a chemical analysis of the organs revealed large amounts of sodium fluoride. Chemical analysis of the stomach, liver, kidneys and bowel of the second sister also revealed large amounts of sodium fluoride. The white powder in a wrongly labeled bottle was found to contain 90 per cent of sodium fluoride. The fourth fatality occurred following the ingestion of two teaspoonfuls of rat poisoning, with suicidal intent. Chemical analysis of the stomach tissue gave positive tests for sodium fluoride.

Dyrenfurth and Kipper[9] report a case of fatal poisoning with a fluoride compound contained in a vermin exterminator. Fullerton[10] reports the fatal fluoride poisoning of a man, aged 76, who mistook sodium fluoride for epsom salt, both of which were kept on a pantry shelf. The physician, who arrived within one hour of the accident, found the words "sodium fluoride, put with salt for ants" on the carton. He immediately telephoned to the place of purchase to inquire regarding the proper antidote. He was informed, "There is no antidote, and it is not poisonous except in large doses." The patient experienced nausea, vomiting and cramp-like pains in the legs and fingers; he died during the evening of the same day. Autopsy was not obtained. The contents of the container were subjected to chem-

2. Stanton, J. N., and Kahn, Max: Sodium Fluoride Poisoning, J. A. M. A. **64:** 1985-1986 (June 12) 1915.
3. Baldwin, H. B.: The Toxic Action of Sodium Fluoride, Tr. Am. Chem. Soc. **21:** 517-521, 1899.
4. Schyzzer, F.: Chronic Fluorine Poisoning, New York M. J. **24:** 1-6 (July 6) 1901.
5. Hickey: Bull. Massachusetts Board of Health, 1911, p. 341 (cited by McNally, footnote 8).
6. Vallée, C.: Nonfatal Poisoning by Sodium Fluoride, J. de pharm. et chim. **21:** 5-8, 1920.
7. Bizot, A. R.: Sodium Fluoride Poisoning, Kentucky M. J. **22:** 156-159 (May) 1924.
8. McNally, W. D.: Four Deaths Caused by Sodium Fluoride, J. A. M. A. **81:** 811-813 (Sept. 8) 1923.
9. Dyrenfurth, F., and Kipper, Friedrich: Fluorine Poisoning, Med. Klin. **21:** 846-848 (June 5) 1925.
10. Fullerton, W. W.: Two Rather Uncommon Fatal Cases of Poisoning, New England J. Med. **203:** 423 (Aug. 28) 1930.

ical analysis, which revealed that the substance was sodium fluoride.

The reports of the chief medical examiner of the city of New York contain records of three accidental deaths from sodium fluoride poisoning in 1918-1920, two accidental deaths in 1925, one accidental and one suicidal death in 1926, one accidental death in 1927, three in 1928, one in 1929, and six in 1930.

Sodium fluoride is widely used in the arts as an insecticide, wood preservative, food preservative and for the etching of glass. Hydrofluoric acid has caused many serious cases of fluoride poisoning, with several deaths. Sodium fluoride (NaF) exists as a white powder crystallizing in colorless cubes. It possesses an acrid bitter taste and is soluble one part in twenty-five parts of water. It is a general protoplasmic poison, exerting a strong local irritant action on mucous membranes. When given in small amounts, fluorides are readily absorbed and deposited as calcium fluoride in the bones. Small amounts of fluoride are normally found in the bones and teeth. Traces of fluoride are normally found in the organs and body fluids.

Chronic fluorine poisoning is recognized as an important industrial hazard in France, Japan and Switzerland, where fluorine and its salts are used extensively in the manufacture of glass, paint, aluminum, parasiticides, food preservatives, in the tanning industry and in chemical laboratories. Largely owing to the researches of Cristiani,[11] it has become increasingly apparent in Europe that the continued ingestion of small quantities of the salts of fluorine, or the inhalation of its acids, produces in animals and in man a somewhat characteristic clinical state, evidenced by slowly progressive cachexia, anemia, fragility of the bones with spontaneous fractures, stiffness of the hands, and respiratory paralysis in the fatal cases. Since the same exposures exist in many American industries, it seems quite probable that cases of chronic fluorine poisoning may have escaped recognition.

REPORT OF CASES

FATAL CASE.—*History.*—Mrs. E. B., aged 39, a housewife, was admitted to the receiving ward of the Miami Valley Hospital at 10:15 a. m., Sept. 8, 1931, in a state of profound shock, with a peculiar grayish blue cyanosis of the skin and mucous membranes. The history, related by her husband, revealed that the patient arose from bed at 6 o'clock of the same morning. She went at once to the medicine cabinet and withdrew a round pasteboard container, thinking it to be epsom salt (magnesium sulphate). She took a heaping tablespoonful of this powder in a glass of water. Immediately after swallowing the mixture she complained of a burning, bitter taste in her mouth, followed almost immediately by marked nausea and violent vomiting and retching. The husband, knowing of her natural dislike for the taste of magnesium sulphate, gave little heed to her complaints. About half an hour later the patient experienced diarrhea, which was followed by many similar liquid bowel movements. The husband gave her molasses by mouth, which afforded her no relief. She became prostrated and was moved to her bed. The husband asked her repeatedly whether she was sure she had taken epsom salt and she persisted in her assertion that she "knew epsom salt when she saw it."

On the advice of neighbors, the husband prepared an infusion of peach tree leaves, which he administered to his wife, without relief of symptoms. The vomiting and diarrhea progressed to an alarming degree and the husband became suspicious for the first time that she may have taken something other than magnesium sulphate. He discovered the box of roach powder, labeled "Sodium Fluoride for Roaches," in the place ordinarily occupied by the box of magnesium sulphate. The two containers were practically identical and were ordinarily kept side by side in the medicine cabinet. There was no statement on the sodium fluoride container to indicate that the contents were poisonous. On discovering that his wife had taken roach powder by mistake, Mr. B. walked to the police station and reported the incident. His wife was immediately brought to the hospital in an ambulance, some four hours and fifteen minutes after the ingestion of the sodium fluoride. Because of the history, a stomach tube was inserted and the stomach washed with several liters of lime water (liquor calcis). Ten cubic centimeters of calcium chloride (10 per cent) was given intravenously. Large amounts of lime water were introduced every half hour into the stomach and duodenum through a gastroduodenal catheter inserted through the nose.

The patient's general condition appeared to improve quite rapidly. At 1 p. m., while talking in a rational manner to the nurse, she suddenly experienced a generalized convulsion, became extremely cyanotic, passed urine and feces involuntarily, and died of respiratory paralysis within two minutes. Injections of caffeine sodiobenzoate and epinephrine were of no avail.

Autopsy.—The body was that of a well developed, well nourished woman. The skin showed deep grayish blue cyanosis, most marked over the scalp, face, neck, upper thorax and upper extremities. The skin of the vulva, the perineum and the inner aspects of the thighs for a distance of 15 cm. below the perineum showed marked grayish discoloration, apparently produced by the fluoride content of the urine. The buccal and pharyngeal mucous membranes and the mucosa of the vagina, labia minora and the inner aspect of the labia majora showed similar bluish gray discoloration. Examination of the thoracic organs revealed no abnormalities other than abundant persistent thymic tissue and extreme passive congestion of the heart and lungs, with moderate terminal pulmonary edema. The gastric mucosa and submucosa showed extreme acute passive congestion and edema, with multiple pin-head to match-head size petechiae; the mucosa was covered with a thick layer of blood-tinged mucin. There was no evidence of erosion or ulceration of the gastric mucosa. The lower third of the esophagus showed similar changes. The duodenal mucosa showed more extensive petechial hemorrhages of the mucosa and submucosa, many of which were confluent, producing irregular areas varying from 1 to 3 cm. in diameter. The upper third of the small intestine showed extreme acute passive congestion and edema with scattered petechial hemorrhages, much less marked than in the duodenum. The liver was of deep slate-purple with mottled grayish yellow areas, presenting the characteristic appearance of extreme acute passive congestion with advanced cloudy swelling and patchy fatty degenerative infiltration. The kidneys showed extreme acute passive congestion and diffuse cloudy swelling. The mucosa of the urinary bladder showed extreme acute congestion with scattered small petechiae. Microscopic examinations confirmed the gross observations.

The pathologic diagnosis was: Accidental sodium fluoride poisoning (accidental ingestion of sodium fluoride dispensed as "roach powder"). Extreme passive congestion and edema, with petechial hemorrhages, of gastric, duodenal and jejunal mucous membranes. Extreme passive congestion, with grayish blue discoloration of buccopharyngeal and vaginal mucous membranes and skin of inner aspect of thighs. Grayish blue cyanosis of skin, most marked over scalp, face, neck, upper part of the thorax and upper extremities. Extreme acute passive congestion of all organs. Terminal pulmonary edema. Advanced cloudy swelling of liver and kidneys. Healed pulmonary and bronchial node tuberculosis. Early atherosclerosis of the aorta. Left parovarian multilocular cystadenoma. Old adhesive pleuritis.

Chemical analysis[12] of the compound in the cardboard container taken from the medicine cabinet revealed approximately 90 per cent sodium fluoride. Strongly positive qualitative tests for sodium fluoride were obtained from the stomach, duodenum, liver and kidney tissue. Quantitative analyses revealed 0.21 Gm. of sodium fluoride per hundred grams of stomach tissue; 0.185 Gm. per hundred grams of liver tissue; and 0.12 Gm. of sodium

11. Cristiani, H.: Detection and Prevention of Fluorine Poisoning, Presse méd. **35**: 578-579 (May 7) 1927. Cristiani, H., and Chausse, P.: Chronic Poisoning from Small Doses of Sodium Fluoride, Compt. rend. Soc. de biol. **96**: 843-844 (April 1) 1927.

12. The authors are indebted to Carl McD. Ritter, B.S., Ph.G., for cooperation in the chemical analyses.

fluoride per hundred grams of kidney tissue. Glass was readily etched with the sodium fluoride obtained from the liver tissue. It was estimated that approximately 18 Gm. of sodium fluoride had been ingested.

NONFATAL CASES.—A group of seven persons was admitted to the receiving ward of the Miami Valley Hospital, Sept. 15, 1931. Approximately half an hour before admission the seven persons had eaten biscuits in the preparation of which a tablespoonful of sodium fluoride was accidentally substituted for baking powder. Within a few moments after eating the biscuits all these persons became nauseated, vomited and complained of cramplike pains in the abdomen. Gastric lavage, in which large amounts of lime water had been used, was instituted immediately on arrival at the hospital. Five ounces (150 cc.) of lime water was administered through a gastroduodenal catheter every half hour. All the patients but one obtained almost immediate relief. One patient, a man, aged 32, was retained in the hospital over night because of persistent nausea, vomiting and prostration. He was given repeated injections of lime water through a gastroduodenal catheter and two injections of 10 cc. of calcium chloride (10 per cent) intravenously. He was discharged from the hospital the day following the accident, apparently entirely recovered.

DIAGNOSIS

In man, the chief symptoms of acute sodium fluoride poisoning are the sudden development of nausea and vomiting, accompanied by burning, cramplike abdominal pains, and diarrhea. Clonic convulsions have occurred in occasional cases. A peculiar grayish blue cyanosis has been observed in some cases, possibly due to the formation of fluormethemoglobin. Death is apparently due to the direct action on the cardiorespiratory centers in the medulla. The blood and urine may be analyzed chemically for the presence of sodium fluoride.

TREATMENT

The important consideration in the treatment of sodium fluoride poisoning is the employment of calcium-containing substances in order to convert the soluble sodium salt to insoluble calcium fluoride. This is best accomplished by copious, repeated gastric lavage with lime water or a weak solution of calcium chloride and by the intravenous injection of calcium chloride or intramuscular injection of calcium gluconate.

SUMMARY AND CONCLUSIONS

1. Sodium fluoride is widely used in this country as an insecticide. Despite the fact that many fatalities have occurred following its accidental substitution for saline laxatives and baking powder, it is still widely dispensed without any indication that it is a poisonous substance.

2. One fatal case and seven nonfatal cases of accidental sodium fluoride poisoning were encountered at the Miami Valley Hospital, Dayton, within one month. The fatality resulted from the accidental substitution of sodium fluoride for epsom salt. The nonfatal cases resulted from the accidental substitution of sodium fluoride for baking powder in the preparation of biscuits. Since the labels on containers of insect powders containing sodium fluoride give no indication of its poisonous properties, such containers are commonly kept in medicine cabinets and in kitchen cupboards.

3. The toxic properties of sodium fluoride are not generally appreciated, largely because of the inadequate information, or misinformation, contained in textbooks on toxicology.

4. The urgent necessity for the proper labeling of containers of sodium fluoride-containing insecticides is apparent.

NONSPECIFIC IMMUNOTRANSFUSIONS IN HEMOLYTIC STREPTOCOCCUS SEPTICEMIA

ANALYSIS OF BLOOD CHANGES BY THE SCHILLING METHOD

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This report deals with a case of hemolytic streptococcus septicemia apparently cured by a series of immunotransfusions, five being nonspecific and the final one specific.

The work is in the nature of a supplement to that of Brody and Crocker,[1] in which another patient with hemolytic streptococcus septicemia was treated first by ordinary transfusions and a series of intravenous antiseptics — including mercurochrome-220 soluble, metaphen and Pregl's solution of iodine—without improvement, and later by *specific* immunotransfusions with apparent cure. Our current modification in therapy, using *nonspecific* immunotransfusions, was recommended by Dr. Brody.

B. Y. a Negro woman, aged 35, entered the medical wards of Philadelphia General Hospital in the service of Dr. A. A. Stevens, Dec. 16, 1931, complaining of pain in numerous joints, chills, fever and weakness.

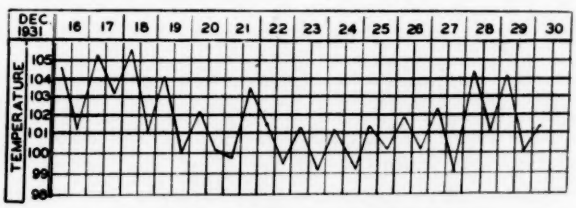

Chart 1.—Temperature following admission.

The onset of the present illness occurred, Dec. 3, 1931, with a violent chill, profuse sweat, stiffness, soreness, and moderate swelling of both knees. By December 10, both ankles, elbows and shoulders were affected.

A physical examination on entry showed that the patient was perspiring heavily; the teeth were poor; the tongue was coated, and there was slight bilateral submaxillary adenopathy. The heart was normal. The blood pressure was 120 systolic and 72 diastolic. There was a slight swelling of both knee joints. The left shoulder and elbow were inflamed.

These symptoms continued, with the temperature showing a septic course, as illustrated in chart 1, while search was made for the etiology. The laboratory examination, December 17, revealed 2,880,000 red blood cells, and 15,300 white blood cells, with hemoglobin 60 per cent, polymorphonuclears 78 per cent, and lymphocytes 22 per cent. December 18, chemical examination of the blood revealed sugar 137 and urea, 11. The Wassermann test, December 19, was negative. An electrocardiogram, December 18, showed nothing definitely abnormal. December 28, there were no malarial organisms on a blood smear. December 31, a blood culture yielded no growth.

Jan. 4, 1932, the patient had a severe chill of nine minutes' duration, followed by a rise in temperature to 105 F., as pictured in chart 2. She was delirious and appeared moribund. Though no petechiae were found, the case was then suspected of being one of bacterial endocarditis, especially in view of a harsh systolic murmur over the mitral area, first heard, December 28. Accordingly, a second blood culture was taken while the temperature was elevated. It showed hemolytic streptococcus in pure culture. This was confirmed by a third blood culture, taken January 7.

From the Philadelphia General Hospital.

1. Brody, William, and Crocker, W. J.: Specific Immunotransfusion in Treatment of Septicemia, J. A. M. A. **98**: 2191 (June 18) 1932.

It was decided to treat this septicemia at once by a series of nonspecific immunotransfusions. Accordingly, January 13, the first donor, W. O., was given 50 million killed typhoid bacilli by vein and put to bed for the moderate chill, which he experienced within an hour. Seven hours after this injection, 500 cc. of his blood was withdrawn and citrated. Half the citrated blood was set aside in a refrigerator, and the remaining 250 cc. given by vein to the patient. No appreciable effect was noted. January 15, the patient's opsonic index was found to be 0.8, and the remaining 250 cc. of citrated blood (refrigerated) was given the patient by vein. A sharp chill occurred, followed within one hour by a rise in temperature to 104 and within six hours by a drop to normal. Again, on January 19, a transfusion of 200 cc. of citrated blood was given, J. B., the son, being used as donor, his blood having been prepared in the same way by typhoid shock. No general reaction occurred in the patient.

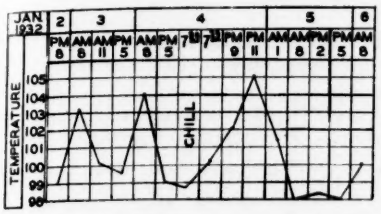

Chart 2.—Temperature from January 2 to January 6.

A blood culture, taken January 23, was sterile. Clinically, the patient was less acutely ill at this time, except for wide temperature variations. January 30, the fourth nonspecific immunotransfusion was given, 280 cc. of blood from M. B. being used, without citrate, eight hours following injection of 50 million killed typhoid bacilli into the donor's vein. The patient again suffered a prompt chill, a rise of temperature within one hour to 104 and a fall within six hours to normal. On this occasion the temperature was recorded each hour and found to describe the curve shown in chart 3.

No clinical evidence of infection had been found anywhere except in three diseased teeth. By February 4 the patient's general condition had so improved that, despite the danger of relapse, her most diseased tooth was extracted. In addition to a flare up of severe joint pains, within forty-eight hours her temperature had risen to 102, and within seventy-five hours had again mounted above 104. This exacerbation soon subsided, but a culture made of the tooth the day of the extraction was reported as positive for hemolytic streptococcus, and the blood, one day after the tooth extraction, showed hemolytic streptococcus again in pure culture.

A fifth nonspecific immunotransfusion was then given, February 10, M. C. being used as a donor seven hours following the usual typhoid shock, and 300 cc. of noncitrated blood being transfused. A severe chill followed, as on two previous occasions. A blood culture taken, February 12, was sterile.

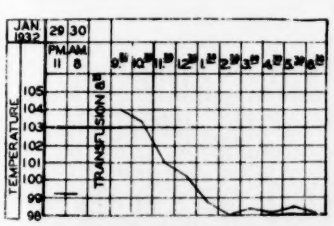

Chart 3.—Hourly variations in temperature following fourth immunotransfusion, illustrating typical response.

Clinically, the patient was so obviously improved, following her fifth nonspecific immunotransfusion, that she could have been discharged. However, during the previous four weeks the blood of J. B., a suitable donor, had been built up to resist the patient's infecting organism; so on February 19 a direct transfusion of 250 cc. of this specifically immunized blood was given. The patient suffered no evident reaction.

Increasing resistance of the patient to her infecting streptococcus was proved by agglutination titers determined coincident with those of J. B., the specific donor, as shown in table 1.

As an added safeguard, toward the close of her hospitalization the patient was given three injections of her own vaccine by vein in increasing dosages, thus: February 26, 50 million; March 4, 100 million; March 9, 150 million. None of the three caused a constitutional reaction.

March 10, the patient was discharged, the only vestiges of her illness being slightly diminished motor power in her affected left shoulder and a soft systolic murmur at the mitral area. Although a bacterial endocarditis of hemolytic streptococcus origin was considered a possible sequel, this diminishing murmur was interpreted as being relative rather than organic, and I look for its disappearance.

Since discharge, the patient has reported back to the hospital for extraction of her second and third diseased teeth. Both were without reaction. A final follow up, April 21, showed the patient in excellent general condition, with a gain of 10½ pounds (4.7 Kg.) in the eight weeks following the final transfusion. Table 2 summarizes the period of treatment.

Throughout this experiment in therapy there has been a detailed study of the patient's blood made by Dr. Walter Crocker of the Laboratory of Clinical Pathology, with special attention to fluctuations in the Schilling counts. These data are summarized in two different forms in charts 4 and 5. The irregular line

DATE	HGB %	RBC (in millions)	WBC (in thousands)	TL %	TM %	E %	B %	M	J	ST	SEG	TN %	SI	MI
12-30-31	60	2.29	18.3	14	2				12	29	43	84	10	16
12-31	60	2.58	14.1	20	5				15	10	50	75	5	8
1-4-32	60	2.76	17.4	4	1				5	40	50	95	9	14
1-8	70	3.51	12.5	10	10					20	60	80	3	5
1-11	50	2.40	15.0	15	1				3	45	36	84	13	21
1-13	50	2.20	19.4	20						60	20	80	30	48
1-14	60	2.81	13.3	8	2					60	30	90	20	32
1-15-AM	65	2.99	14.0	18	2					40	50	80	10	16
1-15-PM	70	3.20	24.0	3					2	20	60	15	97	55	88
1-18	70	3.43	15.6	12	8						50	30	80	16	26
1-19	60	2.84	19.8	8	4				4	40	24	88	10	16
1-20	70	3.24	15.1	18	4				1	8	33	40	80	10	16
1-26	70	3.10	10.5	40	2				2	20	38	58	8	10
1-29	75	3.28	13.2	38	2				4		38	20	80	20	32
1-30	75	3.30	15.3	2					4	36	48	10	98	90	144
2-1	75	3.30	13.6	36							28	42	64	5	8
2-2	75	3.34	12.6	30	2				3	3	20	40	68	20	32
2-3	75	3.29	8.8	30							24	36	70	5	8
2-6	75	3.34	7.4	40							32	28	60	10	16
2-8	75	3.26	10.2	34							38	28	68	13	21
2-9	75	3.40	9.2	34					6	8	24	30	68	12	19
2-10	75	3.30	8.2	44	2					8	32	12	54	35	56
2-11		3.20	12.1	28	2	1	1			1	50	17	68	30	48
2-13			11.1	50					2		18	32	50	5	8
2-15			8.8	20	8	2				6	16	48	70	5	8
2-16			10.1	34						10	10	48	68	5	8
2-17			7.5	38	2					8	10	42	60	5	8
2-19	80	3.85	10.4	28							28	46	72	5	8
2-20	80	3.70	9.8	44	4					8	12	32	52	7	10
2-22	80	3.78	9.8	18						2	22	60	84	3	5
2-23	60	3.65	13.4	26						8	36	32	74	12	17
2-25			7.3	46							18	36	54	5	8
2-26			8.9	50						2	14	34	50	5	8
2-29			11.3	42							18	42	58	4	8
3-1			7.0	40	2						18	40	58	5	8
3-2		3.33	6.8	28							30	42	72	7	10
3-4 & 5															
3-10			7.6	32							30	38	68	8	12
3-16		3.53	8.6	56							14	28	42	5	8
4-21		3.80	6.1	40					4	12	44	60	4	6

TL-TOTAL LYMPHOCYTES
TM-TOTAL MONOCYTES
TN-TOTAL NEUTROPHILS
E-EOSINOPHILS
B-BASOPHILS
M-MYELOCYTES
J-JUVENILES
ST-STABS
SEG-SEGMENTERS
SI-SHILLING INDEX
MI-MULTIPLE INDEX (SHILLING X 16)

Chart 4.—Summary of blood changes, including Schilling index.

running through the Schilling counts from top to bottom of chart 4 is an attempt to show graphically the "shifts" to the left or right throughout the course of treatment. It would appear, from a study of this chart, that shortly following each of the six transfusions a left shift was reversed to a right. The uniformity of this reversal suggests that it is the result of the transfusions, rather than coincidence, and the mechanism is thought to be the inhibitory action on the bacteria and their toxins of immune substances (five time nonspecific and once specific) transferred from donor to patient.

TABLE 1.—*Titer of Blood Serums vs. Specific Streptococcus*

	B. Y. (Patient)	J. B. (Specific Donor)
2- 3-32	1: 20	1: 40
2-19-32	1:120	1:320
3-10-32	1:320	1:640

CONCLUSIONS

1. A series of immunotransfusions, five nonspecific and one specific, was given a patient with a proved hemolytic streptococcus septicemia. Following the third transfusion, a blood culture was found to be sterile and the patient was clinically improved. Subsequently a diseased tooth was extracted, and a culture from its roots yielded hemolytic streptococcus. At once the symptoms of polyarthritis, chills and fever recurred, and the blood stream again showed hemolytic streptococcus in pure culture. Following the fifth (nonspecific) and sixth (specific) immunotransfusions, the blood culture was persistently negative and the patient in good health.

TABLE 2.—*Course of Disease*

January 4:	Blood culture; hemolytic streptococcus
January 7:	Blood culture; hemolytic streptococcus
January 13:	First immunotransfusion (nonspecific) of 250 cc. of citrated blood; no reaction
January 15:	Patient's opsonic index found to be 0.8: second immunotransfusion (nonspecific) of 250 cc. of citrated blood; severe chill
January 19:	Third immunotransfusion (nonspecific) of 200 cc. of citrated blood; no reaction
January 23:	Blood culture; sterile
January 30:	Fourth immunotransfusion (nonspecific) of 280 cc. of blood by direct method; severe chill
February 3:	Titer of patient's serum vs. infecting organism, 1:40
February 4:	First tooth extraction; recurrence of joint pains; culture of tooth, yielding hemolytic streptococcus
February 5:	Blood culture; hemolytic streptococcus
February 10:	Fifth immunotransfusion (nonspecific) of 300 cc. of blood by direct method; severe chill
February 12:	Blood culture; sterile
February 19:	Titer of patient's serum vs. infecting organism, 1:320
February 25:	Blood culture; sterile
February 26:	Autogenous vaccine; 50 million organisms by vein
March 4:	Autogenous vaccine; 100 million organisms by vein
March 9:	Autogenous vaccine; 150 million organisms by vein
March 10:	Patient discharged from hospital
March 16:	Second tooth extraction; no reaction
March 23:	Third tooth extraction; no reaction
April 21:	Final check-up examination; condition good

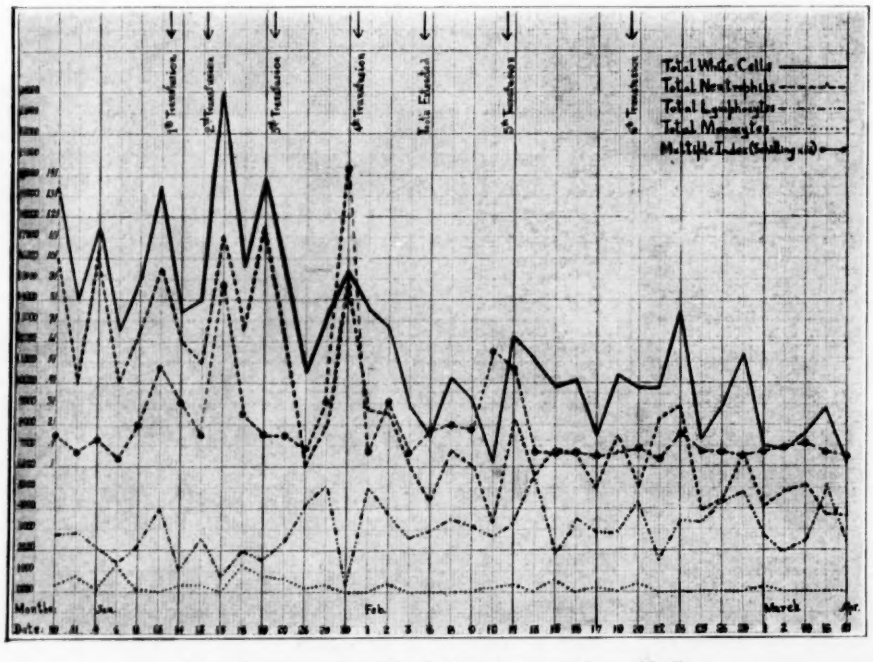

Chart 5.—Summary of blood changes presented graphically.

2. A detailed check on the blood picture before and after each transfusion by means of the Schilling method suggests that the transfusions were responsible for definite and measurable increase in the defense mechanism.

3. Though with such brief experience no sweeping claim is warranted, the value of nonspecific immunotransfusions in this case of septicemia seems sufficient to justify wider experiments in the application of this form of therapy.

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IMMUNOTRANSFUSION IN SCARLET FEVER

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DETROIT

Present-day scarlet fever in the United States is a relatively mild disease. In certain sections of the world, notably the Balkan countries and northern China, the fatality continues high. In most parts of Europe and in the United States the case fatality rate ranges from one death per hundred reported cases to perhaps three or four among hospital patients. In general, the days no longer exist when from 6 to 10 per cent of cases terminate fatally.

Under present conditions, a further decrease in the number of deaths can seemingly be best accomplished by centering attention on patients who are critically ill. That effort might well reflect more strongly on the general death rate than would refinement in methods applicable to all patients, because so many mild illnesses terminate favorably under any circumstance.

The method of immunotransfusion has been developed with this in view. In certain unusual circumstances it is believed to have merit as an emergency method not possessed by other procedures. A comprehensive clinical experience indicates that it has materially reduced the fatality rate among hospital patients.

Favorable evidence has accumulated regarding the value of the transfusion of blood in acute infectious diseases. If the element of specific immunity can be added to the beneficial effect of simple transfusion, the results should be even better. This principle was first advanced by Wright,[1] who practiced transfusion of blood from donors previously immunized with bacterial vaccines. He applied the term immunotransfusion to the procedure. Since naturally acquired immunity in man is of higher grade than that artificially induced, persons recently recovered from a specific infectious disease should theoretically be more satisfactory as immune donors.

Occasional scattered case reports represent the literature of this procedure in scarlet fever.[2] The method was apparently first used for typhoid.[3] Scarlet fever is

This study has been aided through a grant from the Commonwealth Fund of New York.
From the Herman Kiefer Hospital and the Division of Epidemiology, Department of Health.

1. Wright, A. E.: Lancet **1**: 489 (March 29) 1919.
2. Snow, I. M., and Fairbairn, J. F.: Arch. Pediat. **40**: 15 (Jan.) 1923. Clemens, J.: Med. Klin. **25**: 1021 (June 28) 1929. Abrami, P., and Tzanck, A.: Paris méd. **2**: 104 (Aug. 1) 1931.
3. Schottmüller, H.: München. med. Wchnschr. **73**: 1735 (Oct. 15) 1926. Hänsch, G., and Hartmann, E.: Deutsche med. Wchnschr. **53**: 2017 (Nov. 25) 1927.

not a stable disease, nor is any communicable disease for that matter. Long continued observations are therefore necessary to determine the worth of any therapeutic measure. This requirement has been met in that transfusion of whole unaltered blood from persons recently recovered from scarlet fever has been practiced since 1927 in the management of patients critically ill with the disease or its complications. During that time, 13,003 patients with scarlet fever of all grades of severity have furnished opportunity for a thorough test.

Three factors theoretically contribute to the value of the method: One is the important nutritive effect to be derived from any transfusion through the transfer of physiologically active erythrocytes. The benefit to the secondary anemia, which so commonly accompanies hemolytic streptococcus infections, is not to be discounted. The method has a second advantage in that resistance is increased by the transfer of large numbers of leukocytes, which in the presence of immune serum possess an enhanced phagocytic activity against the infectious agent. Finally, humoral immunity is passively conferred by the specific antibodies of the serum in a manner comparable to convalescent serum therapy, the value of which has been repeatedly corroborated.[4] With immunotransfusion, however, the amount of protective substances is from five to ten times greater than is ordinarily accomplished by the injection of serum and, furthermore, is introduced into the blood stream directly rather than indirectly, as by the intramuscular route.

TECHNIC OF IMMUNOTRANSFUSION

The transfusion of whole unaltered blood can be accomplished either by multiple syringes or by a mechanical apparatus for transfusion. It is not uncommon practice to use a syringe, rinse it with sterile salt solution and again aspirate blood from the donor. Since many patients with septic scarlet fever have a bacteremia, adequate protection of the donor requires that no syringe should be used more than once. After blood has been drawn from the donor and delivered to the recipient, the syringe should be discarded and a fresh one used to continue the transfusion.

The mechanical apparatus devised by Brines[5] has been used in most of the transfusions of this series. The operation is accomplished more rapidly than with syringes; the method is equally efficient in protecting the donor and has the added advantage of requiring only one physician without technical aid.

Transfusion without delay is often desirable and many times necessary because patients are frequently in a critical condition when first seen. In some few instances the ultimate outcome has apparently been determined by the immediate availability of a donor. In hospital practice all adult patients are tested for their blood group and examined for evidences of syphilis and tuberculosis when first admitted to the wards. Preparation for immunotransfusion then requires only the determination of the blood group of the patient and the selection of a proper donor from those currently available. Transfusion has been completed within forty minutes after a patient has reached the hospital.

Persons convalescent from scarlet fever have not been used as donors of blood earlier than the fifteenth day of their illness. Convalescence has preferably not exceeded three or four months, although the original illness has been as far removed as a year. Donors are listed according to their blood group, with the date of scarlet fever, age, weight, address and telephone number. Periodic revisions keep the list current. Donors are paid a fee, and no difficulty has been encountered in providing adequate numbers.

Immunotransfusion is by no means limited to hospital practice, although it is most conveniently performed under operating room conditions. An appreciable number of the patients in this series were treated at home.

No small part of the benefit from immunotransfusion is thought to be derived from the red and white cells of the transfused blood. Consequently unaltered blood has been transferred directly from vein to vein in an attempt to avoid as far as possible osmotic or other changes in the physiologic status of erythrocytes and leukocytes. Sodium citrate or any other anticoagulant has not been used. If a simple serum effect were desired, this consideration would not be important.

One transfusion has usually produced the desired effect when the clinical indication is sepsis associated with early scarlet fever. Less commonly transfusion has been repeated two or even three times. Five patients received four transfusions; another, five.

TABLE 1.—*The Number of Immunotransfusions for Individual Patients*

Number of Transfusions	Early Septic Scarlet Fever		Late Septic Scarlet Fever	
	Cases	Deaths	Cases	Deaths
One	95	15	95	17
Two	10	2	17	5
Three	5	1	13	6
Four	4	0	1	0
Five	0	0	1	0
Six	2	1	1	0
Seven	0	0	2	0
Total	116	19	130	28

Three patients had six transfusions and two others with prolonged septicemia had seven. The number of patients treated by this method was 246; the number of transfusions, 355.

Relatively large amounts of blood have been transfused: for infants and small children usually from 100 to 150 cc., for older children about 300 cc., and for adults 500 cc. Deleterious effects on cardiac action have not been noted. An occasional reaction after transfusion has led to increased fever and respiratory effort. The death of one patient was presumably due to transfusion of incompatible blood, as determined by subsequent retest. Donors were at that time selected from members of the same blood group as the recipient, or were universal donors (group IV, Moss). Compatibility has since been determined both by blood grouping and by direct matching of samples.

The better clinical effect from the blood of an immune donor, compared with that from a supposedly normal individual, has been demonstrated many times. Because of financial inability to provide an immune donor, a parent of a child has occasionally acted in that capacity. Failing of the desired result, a second transfusion with immune blood has produced a sharply defined result. The advantage of immunotransfusion should not discount the use of blood from a normal person, particularly if the Dick test is negative, in the event that a recently convalescent donor cannot be obtained. It is worth trial.

4. Weaver, G. H.: J. Infect. Dis. **22**: 211 (March) 1918.
5. Brines, O. A.: The Transfusing of Unmodified Blood, Arch. Surg. **16**: 1080 (May) 1928.

INDICATIONS FOR IMMUNOTRANSFUSION

The number of available donors, even in a large medical service, of itself limits the method to those critically ill, in whom other therapeutic measures have failed or offer little. The indications include severe early septic scarlet fever; the late septic complications of the ear, throat or paranasal sinuses; a bacteriologically demonstrated or clinically definite septicemia or septicopyemia, and less frequently postscarlatinal bacterial endocarditis.

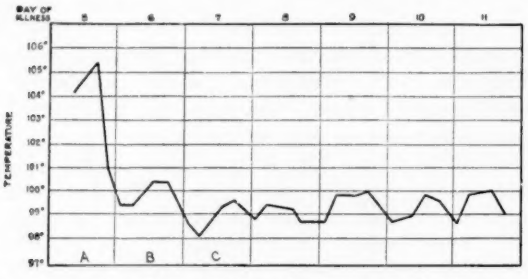

Fig. 1 (case 1).—Early septic scarlet fever; termination by crisis: *A*, pansinusitis; otitis media; septic sore throat; meningismus; immunotransfusion (300 cc.). *B*, restless; improved. *C*, no meningeal irritation.

This is not the place for the discussion of general therapeutic measures in early scarlet fever. Two principles are, however, pertinent to the problem, particularly to immunotransfusion and its indications:

The simple clinical diagnosis of scarlet fever is not sufficiently informative for unreserved choice of suitable therapeutic measures. It is equally essential to determine the clinical form of the disease. Patients of this series were divided into five groups, of which two were large and represented the moderate and moderately severe infections, and two were smaller and included patients with the septic and toxic forms of scarlet fever. Patients with surgical scarlet fever constituted the fifth group.

No single specific or symptomatic method of management is applicable to all patients or to all kinds of scarlet fever. Those with moderate or mild infections respond satisfactorily to symptomatic management. For a smaller number, perhaps one fourth of all patients, some form of specific therapy is well advised, either

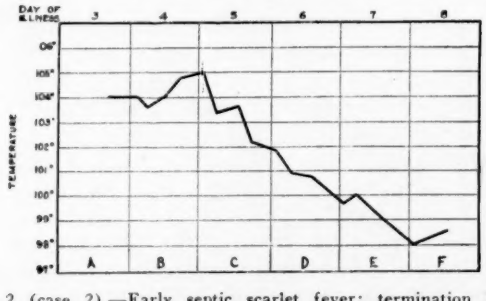

Fig. 2 (case 2).—Early septic scarlet fever; termination by lysis: *A*, extensive exudate, tonsils and pharynx; edema of fauces; cervical lymphadenitis and periadenitis; eruption prominent. *B*, immunotransfusion (450 cc.). *C*, general condition markedly improved; throat clearing. *D*, no exudate in throat; ulcer of palate healing; rash fading. *E*, ulcer practically healed. *F*, uneventful convalescence.

scarlet fever streptococcus antitoxin, human convalescent serum or immunotransfusion. Each has its indications and, within limitations, its contraindications.

Scarlet fever streptococcus antitoxin injected intramuscularly is advocated for patients with moderately severe scarlet fever and an absence of hypersensitivity to horse serum. With demonstrated hypersensitivity, human convalescent serum may be substituted to advantage.

Relatively few instances of truly malignant toxic scarlet fever are encountered in present-day practice, as only 84 cases among the 13,003 of this series were of that type. An effect may be expected from the usual intramuscular administration of antitoxin. Immunotransfusion has been distinctly disappointing in this form of scarlet fever, since each of three patients died. Striking results may usually be obtained by the intravenous injection of scarlet fever streptococcus antitoxin, a method not ordinarily advocated.

In this experience, scarlet fever streptococcus antitoxin has been somewhat disappointing in septic scarlet fever, and yet this is perhaps the one scarlatinal infection in which it is used most commonly, irrespective of opinion as to its general advisability. Septic scarlet fever is responsible for more deaths than any other clinical form. Immunotransfusion in this experience has given results not obtained by other methods.

EARLY SEPTIC SCARLET FEVER

Acute septic scarlet fever is not common but is an important factor in determining the gross fatality rate from the disease. During the years 1927-1931, 10,666 patients with scarlet fever were admitted to the wards of the Herman Kiefer Hospital. The fatality for the

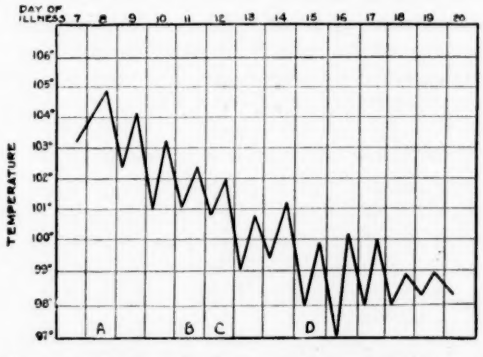

Fig. 3 (case 3).—Late scarlet fever: *A*, immunotransfusion (250 cc.). *B*, rhinitis and sinusitis improved. *C*, eyes readily open. *D*, incision of abscess of lacrimal sac.

328 septic cases was 16.2 per cent; for all others, 0.6 per cent. Only 43 per cent of the deaths were from complications in the course of moderate, moderately severe and surgical forms of the disease, which included 96 per cent of all patients.

The clinical features of septic scarlet fever are familiar to all who have had contact with this disease. Inflammation of the pharynx is frequently so extensive as to give rise to exudate and even pseudomembrane. Actual ulceration of the mucosa is not uncommon. The swollen dry tongue, the abundance of pus escaping from the nasal passages, the swelling of the tissues of the neck, the marked enlargement of the cervical lymph nodes and the tenderness over the paranasal sinuses are clinical features rarely equaled in other septic processes of the throat. The ethmoid cells are often so involved as to broaden the root of the nose and cause edema of the eyelids of such extent that the eyes are completely closed. The patient scarcely escapes involvement of the middle ears. Especially marked is the appearance of profound prostration from general sepsis, which many times can be demonstrated by bacteriologic examination of the blood.

When scarlet fever streptococcus antitoxin was first available, it was hoped that its greatest effect would be in the management of these conditions. Accumulated experience has been disappointing. The serum is pri-

marily antitoxic and lacks potency in antibacterial immune bodies. Septic scarlet fever is primarily due to an invasion of the tissues by hemolytic streptococci rather than from absorption of their toxins. From theoretical considerations, immunotransfusion should be admirably suited to its management.

Only the exaggerated instances of early septic scarlet fever have been treated by this method. Nineteen deaths occurred among 116 cases. Patients with milder septic infections received convalescent serum intravenously, sometimes in combination with streptococcus antitoxin injected intramuscularly.

As with all specific measures, the earlier in the course the treatment is instituted, the more favorable is the outcome. Immunotransfusion within the first four or five days of illness often produces a striking clinical result with the fever terminated by crisis and the subsequent course as uneventful as that of any mild scarlet fever (case 1, chart 1). Termination by crisis is the more common result, but occasionally it drops by lysis (case 2, chart 2). Results have been satisfactory when patients were first seen as late as the sixth or seventh day of the disease, although improvement was less rapid than with earlier transfusion (case 3, chart 3).

The method may still be of value even very late in septic scarlet fever. A patient with extreme sepsis was admitted in a moribund condition on the tenth day of

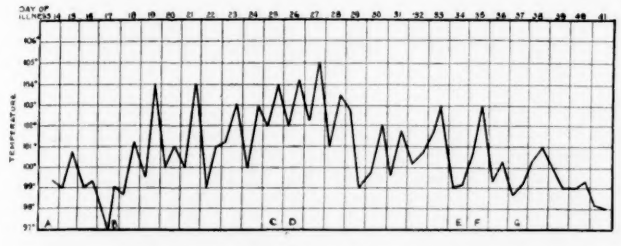

Fig. 4 (case 4).—Septicemia after mastoiditis; late complicated scarlet fever: *A*, otitis media; mastoiditis; hemorrhagic nephritis. *B*, mastoidectomy. *C*, exploration of mastoidectomy wound; no lateral sinus thrombosis. *D*, blood culture, hemolytic streptococcus. *E*, listless, continually drowsy; marked anemia. *F*, immunotransfusion (400 cc.). *G*, sitting up; playful; color brighter; improved.

illness. She was perhaps as critically ill as any patient in this experience. The resident physician voiced the opinion at the time of admission that she could scarcely be expected to survive the hour. She was irrational and cyanotic, and the pulse rapid and weak. The evidences of general sepsis were extreme. Following immunotransfusion the temperature gradually fell, to reach normal limits on the twenty-seventh day of illness, seventeen days after admission to the hospital. Following a protracted convalescence, recovery was complete.

LATE SEPTIC COMPLICATIONS OF SCARLET FEVER

Authorities are in agreement that no known method of specific management produces appreciable effect on the late septic complications, of which those related to the ear and the paranasal sinuses are most common. The complications are essentially the result of invasion of tissue by streptococci. Scarlet fever differs from most communicable diseases in that its complications are due to the infectious agent associated with the acute stage of the disease. Streptococcus antitoxin, as would be anticipated, has been demonstrated repeatedly to be without value in the management of complications. The experience parallels the lack of result with diphtheria antitoxin in such complications of diphtheria as peripheral paralyses or myocardial failure. Thorough and extensive test of convalescent serum has demonstrated its lack of effect. In replacement of the inadequate and all too frequent hopelessness of expectant and symptomatic treatment, immunotransfusion has contributed materially.

Late Sepsis of Middle Ear Disease.—Septicemia in scarlet fever frequently originates from suppurative otitis media which has extended to produce mastoiditis and, in some instances, thrombophlebitis of the lateral sinus. In this series septicemia was determined sixty-

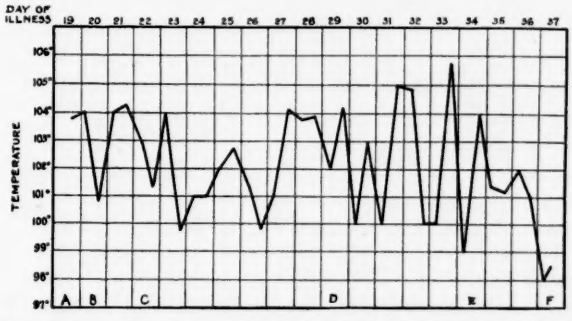

Fig. 5 (case 5).—Lateral sinus thrombosis and septicemia of late scarlet fever: *A*, condition on entering: suppurative otitis media, bilateral; acute mastoiditis; lateral sinus thrombosis; septicemia; marked cervical lymphadenitis. *B*, mastoidectomy, left; ligation of external jugular vein. *C*, mastoidectomy, right. *D*, blood culture, hemolytic streptococcus. *E*, immunotransfusion (300 cc.). *F*, discharged.

nine times and was responsible for seventeen deaths. In forty-five instances, septicemia followed mastoiditis without intracranial extension, and the number of deaths was five. Case 4 (chart 4) is a typical illustration.

Sixteen patients with middle ear infection had lateral sinus thrombosis, five being admitted to the hospital with that condition. The association of middle ear disease, mastoiditis and lateral sinus thrombosis has a grave prognosis, and yet ten of the sixteen patients recovered. The clinical condition of two patients was apparently hopeless, transfusion being performed on one at a time when the fever was 107.2 F. All represented far advanced infection, of which case 5 (chart 5) is typical.

Late Sepsis After Purulent Infection of the Nose and Throat; Septicemia.—Except for early septic

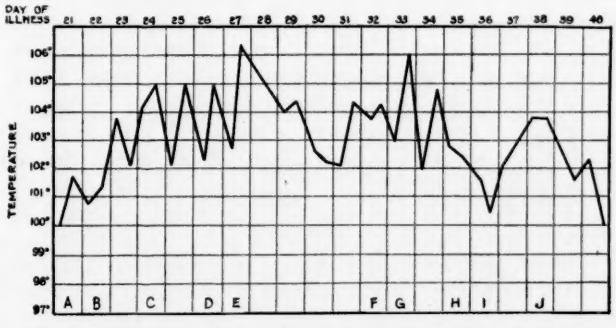

Fig. 6 (case 6).—Septicopyemia in late scarlet fever: *A*, abscess of axillary lymph node after moderately severe but uneventful early scarlet fever. *B*, blood culture, hemolytic streptococcus. *C*, immunotransfusion (200 cc.). *D*, toxic ileus. *E*, immunotransfusion (240 cc.); suppurative arthritis of elbow. *F*, abscess of leg. *G*, immunotransfusion (200 cc.). *H*, three additional abscesses of extremities. *I*, suppurative arthritis of hip. *J*, immunotransfusion (90 cc.).

scarlet fever, this condition furnished the most frequent indication for immunotransfusion. Secondary involvement of the nose and throat after acute scarlet fever is common. Postscarlatinal angina is often limited to a simple tonsillitis but may attain exaggerated proportions. One patient of this group is of more than usual interest, and was the first of this series (chart 6).

RESULTS

In the course of five and one-half years, 13,003 cases of scarlet fever have been under observation. Immunotransfusion has been used in 246. The two common indications for its use have been early septic scarlet fever and the septicemia associated with late complications, of which three groups have been distinguished.

TABLE 2.—*Immunotransfusion in Early and Late Sepsis of Scarlet Fever; Cases and Deaths*

Clinical Condition	Number of Cases	Number of Deaths	Deaths per 100 Cases
Septic scarlet fever, early	116	19	16.4
Late sepsis after purulent disorder of nose and throat; septicemia	69	17	24.6
Late sepsis associated with mastoiditis	45	5	11.1
Late sepsis associated with mastoiditis, sinus thrombosis and septicemia	16	6	37.5
Total	246	47	19.1

The extent to which immunotransfusion was limited to patients manifestly ill is shown by a summary (table 3) which presents the degree of fever at the time of transfusion. Only thirty-two patients had fever less than 102 F., of whom none were in the early stages of septic scarlet fever, the indication for transfusion being prolonged sepsis with low grade septicemia. In 60 per cent of cases the fever was greater than 104 F., while fifty-five patients had fever within the range of from 105 to 106 F. A not inconsiderable number (twenty-two) had fever in excess of 106 F. Five patients were given transfusions of blood with little hope of effect, at a time when the fever was between 107 and 108 F., and two recovered. These data indicate that the selection of patients for treatment by this method was on the basis of a probable adverse outcome and, in not a few instances, apparent hopelessness. More than one fourth (25.5 per cent) of the patients died within thirty-six hours of the time they came to the hospital. In general, patients of this group represented the difficult problems in scarlet fever.

The kinds of associated conditions likewise illustrate the clinical seriousness of the scarlatinal infections treated by this method. Acute mastoiditis was represented eighty-six times, suppurative ethmoiditis

TABLE 3.—*Temperature of Patients at the Time of Transfusion*

Degrees Fahrenheit	Number of Cases	Number of Deaths	Deaths per 100 Cases
Under 102	32	3	9.4
102 to 103	23	4	17.4
103 to 104	45	9	20.0
104 to 105	69	11	15.9
105 to 106	55	11	20.0
106 to 107	17	6	35.3
107 to 108	5	3	60.0
Total	246	47	19.1

forty-one, ulcerative pharyngitis with severe angina twenty-five, empyema thoracis ten, acute endocarditis nine. Thirty-one of the patients had pneumonia. Complications having an unusually serious prognosis include sixteen instances of lateral sinus thrombosis, one of cavernous sinus thrombosis, five with streptococcus meningitis, seven instances of encephalitis, five patients with multiple abscesses of the lung and four with abscess of the brain.

The diagnosis of septicemia was made in eighty-four cases, either by clinical criteria or by culture of the blood or by both. There were if anything more than stated, because the criteria for clinical determination of septicemia were carefully considered and perhaps unusually conservative. This is illustrated by a fatality rate of 27.1 per cent for forty-eight patients with streptococci in cultures of the blood, and a rate of 41.7 per cent for thirty-six without bacteriologic confirmation. The most common local source of septicemia was middle ear disease. Pansinusitis, in one instance eventuating in cavernous sinus thrombosis, was next most common. A few instances of septicemia were dependent on a focus of infection in the mitral leaflets. Others originated from infection of the throat, and for a few the source was indeterminate.

The greatest fatality from scarlet fever is among young children, a circumstance true for most of the acute infectious diseases. Four patients, aged less than 1 year, received immunotransfusion, and one recovered. It is remarkable that only four deaths occurred among nineteen patients aged from 1 to 2 years. Thirty-three cases in the 2 year age group resulted unusually well. The fatality for cases in which transfusion was performed is arranged by age groups in table 4.

CONCLUSIONS

Successful management of early scarlet fever depends on accurate determination of the clinical form of the disease. Proper judgment of the relative seriousness

TABLE 4.—*Case Fatality by Age Groups*

Age, Years	Number of Cases	Number of Deaths	Deaths per 100 Cases	36 Hour Deaths	Per Cent of All Deaths in 36 Hours
Under 1	4	3	75.0	2	66.7
1	19	4	21.1	2	50.0
2	33	5	15.2	2	40.0
3	31	7	22.6	1	14.3
4	31	8	25.8	2	25.0
5 to 9	96	16	16.7	3	18.8
10 to 14	13	0	0.0	0	—
15 to 19	7	2	28.6	0	0.0
20 to 29	8	2	25.0	0	0.0
30 to 39	4	0	0.0	0	—
Total	246	47	19.1	12	25.5

of the infection is a second requisite. Convalescent serum, scarlet fever streptococcus antitoxin and symptomatic measures each have their indications.

Immunotransfusion is superior to other methods in the treatment of acute septic scarlet fever, the so-called scarlatina anginosa or scarlatina necroticans. The results in malignant toxic scarlet fever are less favorable than with scarlet fever streptococcus antitoxin.

Known specific measures have been uniformly disappointing in the management of late septic complications. Immunotransfusion has perhaps its most important indication in secondary sepsis, general septicemia, septicopyemia and acute bacterial endocarditis of late scarlet fever. It is not alone a hospital procedure but has been successfully used in private practice under home conditions. It has been applied in the management of other infectious diseases, including erysipelas, poliomyelitis, measles and meningococcus meningitis.

The results in scarlet fever are of themselves difficult to evaluate because the patients were a group largely selected on the basis of a grave prognosis. The clinical severity of infection is inadequately expressed by mere description. The best index is probably the general fatality rate among large numbers of patients with scarlet fever, to the more serious cases among whom this method was applied. Since the use of immunotransfusion, the fatality rate for 13,003 patients with scarlet fever has been less than half that for the previous 5,000 cases. For 2,167 cases during 1931, the last year of this experience, the rate was 0.6 per cent.

REPORT OF CASES

CASE 1.—A boy, aged 23 months, was admitted to the hospital on the fifth day of illness with severe septic scarlet fever. The fatality at this age is particularly great. Physical examination revealed every evidence of septic scarlet fever, with suppurative ethmoiditis of such a degree that both eyes were closed. There was an abscess of an axillary lymph node, and the child had meningismus of sufficient degree to suggest leptomeningitis. Lumbar puncture revealed a clear cerebrospinal fluid containing 20 cells per cubic millimeter of fluid and a trace of globulin. The fever was 105.4 F. Transfusion was performed shortly after admission. By the following morning the fever had dropped to 99.4 F. and attained a maximum of only 100.4 F., that afternoon. The course thereafter was uneventful and associated with normal temperature.

CASE 2.—A girl, aged 15 years, with unusually severe septic scarlet fever, was seen on the third day of illness. An extensive exudate covered both tonsils, the pharynx and the uvula and suggested diphtheria. A perforating ulcer had completely eroded the left soft palate. Swelling of the faucial tissues, of the regional lymph nodes and of the subcutaneous tissues of the neck was intense. Transfusion was done early the next morning at a time when the fever was 104.8 F. The temperature progressively and consistently dropped each day thereafter, to reach normal on the eighth day of illness, four days after transfusion. The day following transfusion the general clinical condition of the patient was markedly improved. By the third day the rash had faded, the ulcer of the palate gave evidence of healing, and the throat was essentially free from exudate.

CASE 3.—An infant, aged 17 months, was brought to the hospital on the eighth day of illness with malignant septic scarlet fever. Both middle ears were discharging, and the nose and throat presented the usual signs of intense suppuration. Suppurative ethmoiditis caused both eyes to be completely closed. Meningismus was present, and the prolonged general sepsis had led to extreme emaciation. Blood from a patient convalescent from scarlet fever (250 cc.) was transfused at a time when the fever was 105 F. Progress was subsequently slow but continuous. The fever declined essentially one degree each day. Four days later both eyes could be opened readily, and ethmoiditis had largely subsided. Fever was absent by the eighteenth day of illness, the tenth day in the hospital. Convalescence was thereafter uneventful.

CASE 4.—A girl, aged 7 years, was admitted to the hospital on the fourteenth day of scarlet fever because of acute mastoiditis. Both middle ears had been discharging since the eighth day. The fever was 101 F. Within the next two days an increasing tenderness over the mastoid process and definite postauricular swelling indicated the need for mastoidectomy, although the fever was only 99 F. Extensive necrosis of bone was demonstrated at operation. Instead of subsiding, the fever progressively increased and manifested daily septic variations. The lateral sinus was thought to be thrombosed. An exploratory operation showed a localized deposit of fibrin on the wall of the vessel, but no occlusion. On the twenty-fifth day of illness, hemolytic streptococci were found in cultures of the blood. The fever at this time was 105 F. Improvement occurred during the next several days, but subsequently the fever returned to 104 F. and was accompanied by a marked constitutional reaction. The patient was listless and slept most of the time, and the pallor of profound secondary anemia developed. Following immunotransfusion, on the twenty-fifth day, the fever receded to normal limits within three days. Clinical improvement was striking. The patient sat up and was playful; the color was brighter and improvement continuous.

CASE 5.—In a boy, aged 4 years, suppuration of both middle ears developed after scarlet fever. The condition eventually progressed to bilateral mastoiditis. He was admitted to the hospital on the nineteenth day of illness, the fever at that time being 104 F. Left mastoidectomy was performed shortly after admission. Destruction of the bone was so extensive as to have caused complete thrombosis of the lateral sinus. The external jugular vein was ligated and the sinus drained. The general clinical condition of the patient was so unfavorable that it was deemed unwise to proceed with operation of the evident but less severe infection of the mastoid of the opposite side. The second operation was performed two days later. A continuous septic type of fever indicated generalized infection, and hemolytic streptococci were subsequently demonstrated in cultures of the blood. Immunotransfusion was performed at a time when the fever was 105.8 F. The temperature declined each day thereafter, to reach normal limits on the third day. Clinical improvement was even more marked than indicated by the fever curve. On the fourth day after transfusion the patient was removed to his home for further convalescence.

CASE 6.—A girl, aged 26 months, admitted to the hospital on the fourth day of illness, had severe septic scarlet fever, which included ulcerative changes of the pharyngeal mucosa and purulent infection of the nose and paranasal sinuses. After a somewhat prolonged febrile course, the fever became normal and progress was uneventful until the twenty-first day of illness, when a severe secondary sore throat developed. An abscess of an axillary lymph node appeared, and the following day the fever was 103.6 F. A culture of the blood revealed hemolytic streptococci. Immunotransfusion was performed four days after the appearance of secondary angina, at a time when the fever was 106.4 F. Within the next two days the temperature declined to 102 F., to be followed by a secondary rise to 106 F. and the development of toxic ileus. Multiple abscesses of the soft parts appeared in rapid succession, in addition to osteomyelitis of the head of the femur. Two additional transfusions were performed during the next five days. The abscesses were eventually incised, and after the fortieth day the temperature was continuously normal.

Taylor and Hamilton Avenues.

ACCIDENTAL INJURIES IN OFFICE PRACTICE

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NEW YORK

"Primum non nocere"—first of all do not cause any harm—is the classic Latin pronouncement as to the duties of the physician toward his patient. Legal authorities tell us that the average physician when taking charge of a patient must have the reasonable degree of learning and skill that is ordinarily possessed by physicians and surgeons in the locality where he practices. On the other hand, "a physician who holds himself out as being specially versed in some phase of medicine is required to possess special knowledge and skill, not merely such knowledge and skill as the average physician has but such as is possessed by the average specialist." [1]

The modern development of medicine and surgery with the tendency to the extended use of apparatus for diagnostic and therapeutic purposes has made these demands much more complicated. The doctor is not only supposed to be a diagnostician and have a good knowledge of the action of drugs and of the principles of surgery, but is also expected to be a mechanic and somewhat of an electrotechnician. He must be able to supervise and direct his nurses and other technical personnel and is liable for improper treatment on their part; yet no matter how skilled the physician or his personnel, accidents are unavoidable from time to time. My object in this paper is to analyze accidents due to the use of therapeutic apparatus in the practice of physical therapy, exclusive of x-rays, and to present the principles the observance of which (1) will prove reasonable knowledge and skill on the part of both general practitioner and specialist and (2) will tend to keep accidental injuries at a minimum.

Read before the Society of Medical Jurisprudence, April 11, 1932, at the New York Academy of Medicine.

1. Stryker, L. P.: Courts and Doctors, New York, Macmillan Company, 1932, p. 16.

The causes that lead to the occurrence of accidental injuries can be classified in three broad groups: (1) the equation of the operator—improper technic or inattention; (2) the equation of the patient—unusual sensitiveness (or idiosyncrasy, which is particularly true in regard to x-rays), lack of cooperation or contributory negligence; (3) the equation of apparatus and accessories—faulty construction or mechanical breakdown. Many injuries are attributable to an unfortunate combination of causes. Considering the widespread use of physical treatment measures, the number of injuries occurring is almost negligible; as long as the general rules of safe technic are followed, a single cause usually does not lead to any serious injury.

Accidental injuries in the course of office treatment by physical measures can be grouped as follows: 1. Electrical shock, due to the sudden powerful influence of an electric current on the entire body; this may be due to (*a*) accidental contact with a grounded object (water pipe, radiator, electrical socket) while receiving an electric current from an apparatus or while receiving a galvanic bath; (*b*) breakdown between the primary and secondary side of a high tension transformer and lack of sufficient safeguards (magnetic cutout) to prevent the jumping over of the dangerous high tension low frequency current to the patient. 2. Burns of varying kind, due either to excessive current density or to excessive heat or ultraviolet radiation over part of the body. Inflammation of the eyes has occurred through neglect of protecting the eyes against ultraviolet rays. 3. Mechanical injuries, tearing of the skin or rupture of internal organs, due to a blow from an improperly supported piece of apparatus or to excessive action of the apparatus itself, as has happened with some mechanical exercisers.

EQUATION OF THE OPERATOR

The operator of any piece of apparatus used for diagnosis and treatment must have a fair conception of its working mechanism and have full knowledge of the proper technic of its application. As a rule such knowledge must be acquired on the basis of clinical instruction and experience but not from the salesman of apparatus. The operator of any apparatus should be able to visualize what is going on inside the apparatus when it is started, how the energy output of that apparatus is controlled, and how it will affect the parts of the body subject to its influence. He must know how to apply and hold the electrodes in good position and must know how to proceed with any electrical treatment without discomfort to the patient, to the degree of maximum efficiency. He must be familiar with the danger signals of chemical or heat burns. He must take nothing for granted, so far as the patient is concerned, and use all reasonable precautions to avoid accidents, save for wilful acts or neglect of the patient in disregarding properly understood warnings. No complaint of a patient during examination or treatment, no matter how trivial, should ever be lightly brushed aside. I had occasion to render expert testimony in a suit which was very damaging to the defendant physician when the plaintiff testified that, when she cried out with pain during a diathermy treatment, the doctor said, "Don't be a baby," and afterward a good sized burn was found where the pain had been complained of. Part of the proper technic is to see that the patient is made comfortable and remains so during the entire treatment, with the part under treatment well supported and relaxed; also, in a busy office, that a time clock or other controlling device be used to cut off the current automatically at the expiration of the treatment period.

It is an important part of the routine of any office that the parts receiving treatment be carefully inspected before and after each application, any changes being noted. One occasionally hears complaints made by patients that they noticed a blister on returning home after an electric treatment. If thorough routine inspection of the parts after any treatment is consistently carried out and no changes are found in the office, one can safely assert that the lesion complained of did not originate from the treatment there, for any damage to the skin from a galvanic, diathermic or other electric current would produce enough change in the tissues to be visible immediately and not hours afterward except in the case of x-ray reactions which may not manifest themselves for weeks or months after the last treatment. An interesting illustration of this statement is the case of a patient in one of my clinics who had been given one diathermy treatment for a pain of the shoulder following a minor exertion. Three weeks later we heard from his company doctor that he presented himself with a deep ulcer in the shoulder and claimed that it originated from the treatment. We verified the fact that he had received a routine inspection after treatment and no change found. He came back to our clinic and the alleged burn was proved to be a broken down gumma, with a four-plus Wassermann reaction of the blood. His pain after exertion was the first sign of the development of the gumma.

Burns due to heat treatment by lamps as a rule also show up immediately, but occasionally a blister may develop over night, following a long heat exposure. Such lesions are due to the raising of the superficial epithelium by an exudation of lymph, but being quite superficial they dry up in a day or two and never can give rise to a serious complaint. Burns after ultraviolet exposure take twenty-four to seventy-two hours to develop fully, while x-ray burns are well known to take weeks to develop. The chief protection of the operator in such a case is an indisputable record as to a generally correct technic and a machine properly calibrated by a physicist, in case of roentgen therapy.

A final point of safe technic is never to leave a patient alone during a treatment in which the slipping of a conducting cord or a fastening clip or of any of the electrodes could give rise to an immediate burn. Either the physician or his trained office assistants must be ready at all times to decrease the current strength or to shut it off altogether if the patient complains or there is any possible sign of danger. There are timing devices available which, connected to the apparatus, enable the patient to shut off the current by simply pulling a cord; simultaneously a gong summons the operator. This is a perfectly safe arrangement, provided the patient is told how to use it.

EQUATION OF THE PATIENT

The physical and mental equation of the patient is of paramount importance in administering treatments. A safe technic in many instances depends on the patient's cooperation in reporting at once an unpleasant sensation or a feeling of excessive heat, or in keeping still in a certain position; patients sometimes fail to comprehend these instructions for one reason or another.

As is well known, in diathermy and galvanic treatments the theoretical amount of current intensity is estimated according to the size of the active electrode—provided the electrodes are equidistant and on opposite

surfaces of the body. The meter reading on the apparatus, however, mainly serves as a safeguard as to the maximum amount that may be administered. The patient's comfortable toleration is always the principal guide. Yet this may mean two wholly different meter readings in a case of a husky laborer and that of a neurotic woman; and it will be different also in a person with skin anesthesia following a peripheral nerve injury or in a skin with extensive recent scar tissue. I remember a clinic case of a laborer, some years ago, to whom diathermy had been given through the palm of the hand and the patient told to report any sensation of burning. Reliance was placed on the apparent comfort of the patient, and current in excess of the estimated maximum reading was turned on. At the end of the application, during which no complaint had been heard from the patient, there was a deep burn that took six weeks to heal. Uneven contact with slight sparking over an insensitive area may likewise bring on unheralded burns but, as a rule, all diathermy burns are accompanied by a marked sensation of pain. Galvanic burns are apt to occur with less painful sensation.

In certain kinds of technic a feeling of tension, instead of burning or pain, serves as a subjective warning sign, usually in treating the wrist or ankle by the cuff and plate (longitudinal) method. I had occasion to testify in a case in which a person was treated in a hospital by a physician, the demonstrator for a manufacturer, who was anxious to show the favorable effects of diathermy on arteriosclerotic gangrene of the foot. He applied a plate under the sole of the foot, and a cuff round the middle of the calf. The patient complained repeatedly during treatment of tightness about the ankle; yet the operator, evidently relying on the comparatively low meter reading, paid no heed to this. The result was a sloughing off of part of the achilles tendon, a foot deformity, and a warm session in court.

The individual skin sensitiveness toward ultraviolet radiation in those of fair complexion, blondes and old persons is well known and must always receive consideration. Certain sensitizing substances, such as quinine or methylthionine chloride (methylene blue), also may render the individuals temporarily oversensitive to light treatments. The minimal dose within safe toleration of such patients can be determined only by preliminary testing over a small area of the skin. The local application of the following drugs should not be used before or immediately after roentgen treatment: iodine, iodoform, resorcinol, oil of cade, tar preparations, lotio alba, salicylic acid, betanaphthol, chrysarobin, gasoline, benzine, scarlet red, sulphur, benzoic acid, strong mercury preparations and balsam of peru. According to Remer,[2] these tend to increase the skin effects of x-rays.

EQUATION OF THE APPARATUS

Apparatus must be in good working order as an essential for the safe application of any kind of treatment. At the same time, any apparatus used day by day is apt to get out of order through continued friction or wear, such as slow disintegration of insulation due to heat, or through defective construction. When a patient is treated by an apparatus with an undetected defect, a minor mishap or a real tragedy may occur. Kowarschik[3] recently reported two such happenings. In one case galvanic treatment for facial paralysis was administered from a new type vacuum tube galvanic generator, which changes the alternating street current into a direct or galvanic current. One electrode in the form of a half mask was placed over the face, the other over the forearm. A small, cheap circular wire rheostat, similar to the control on radio boards, was used to regulate the strength of the current. At the end of the treatment the assistant slowly turned this control back to zero, and just at that moment the patient cried aloud and fell unconscious to the floor as if struck by an electric bolt. The cause for the profound electrical shock was found in the poor construction of the rheostat, the lever of which swung over from the zero position to 360 degrees—that of full strength—without an intervening catch. The patient thus suddenly received the full strength of the current through the head.

The other, more tragic, case was that of an Italian physician who demonstrated to a group of friends the mild heat effects of a high frequency current by making each hold two cylindric metal electrodes and turning on the current. When the turn of a girl, aged 19 years, came, and the current was put on in the same manner, she fell dead. It was found that a broken wire in the transformer caused the dangerous high voltage low frequency current to jump over into the high frequency circuit, there being, contrary to the safe rule, direct (galvanic) coupling between the two sides instead of the safe inductive or magnetic coupling. In the use of x-ray apparatus there have been several fatal accidents to patients, physicians or nurses, or to a person holding a child in position on an x-ray table. A form of public liability insurance should be carried by physicians to cover such accidents.

The danger of recommending unsafe apparatus for home use is illustrated by a fatal accident in England, in which a young man was killed by shock as he touched an ultraviolet lamp which he lighted while sitting in a bathtub. It was found that the particular make of lamp was electrically short-circuited in a number of ways, and the return ground current did its deadly work, spreading over the large wet surface of his body.

Such extreme cases are, fortunately, rare in this country but should serve as a warning to buy only apparatus of standard make and from a responsible manufacturer. Cheap appliances of flimsy make may readily give rise to similar accidents. Apparatus must be kept in good working order by regular frequent inspection and by immediately correcting any trouble, no matter how trivial. It is bad psychology ever to discuss any trouble with apparatus before a patient. When receiving electrical treatment for the first time, patients are usually apprehensive and any doubts expressed about the smooth working of the apparatus do not sound cheerful to them, may cause them to jump, throw off electrodes at the slightest provocation, and thereby cause a real burn.

SUMMARY

Only the principal factors in causing accidental injuries have been outlined, and no effort has been made to describe these injuries or their treatment in detail. It is evident that any form of office treatment by apparatus that is powerful enough to do good is capable of causing various degrees of injury through improper technic, contributory negligence of the patient, or mechanical faults in the apparatus or accessories. General practitioner and specialist alike must be

2. Remer, John, and Whiterbee, W. D.: X-Ray Dosage in Treatment and Radiography, New York, Macmillan Company, 1923.
3. Kowarschik, Josef: Die Gefahren elektromedizinischer Apparate, Ztschr. f. d. ges. phys. Therap. **42**: 82-89, 1932.

acceptably trained and be ever watchful to administer treatments within a large margin of safety so that, whatever accident may occur from time to time, it will belong among the really unavoidable ones.

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IODISM

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Iodism is now rarely seen, since iodides have been replaced by other remedies. At present iodine intoxication is limited mainly to attempts at suicide or to accidentally swallowing the tincture of iodine.

The introduction of solutions and compounds containing large percentages of iodine are used extensively in therapeutics or as opaque substances for radiography of cerebral and spinal spaces, genito-urinary organs, uterus and tubes, sinuses and bronchi. Such preparations are potential sources of iodism. Idiosyncrasy to iodine and inevitable errors and accidents of technic may lead to an increasing frequency of these conditions unless the dangers are realized and measures for prevention and treatment are instituted.

The following account of my own case may be of interest:

April 29, 1932, at 10:30 a. m., 30 cc. of chloriodized peanut oil, as a therapeutic measure for chronic bronchitis and diagnostic aid for suggestive early bronchiectasis, was administered to me by Dr. Hugo Deuss by the passive introduction method proposed by Alton Ochsner.[1] This method, in brief, is as follows: The pharynx and hypopharynx are anesthetized with 10 per cent cocaine solution by an applicator to prevent the swallowing reflex. Following this, from 3 to 5 cc. of a 3 per cent solution of procaine hydrochloride is poured on the tongue and runs down into the bronchi and controls the cough reflex. From 15 to 30 cc. of the iodized oil is poured on the tongue, which is pulled out and the iodized oil goes into the trachea and bronchi. Except for one interruption caused by coughing, with expectoration of 5 cc. (estimated), the introduction was completed. Films proved negative for bronchiectasis and some of the oil was shown to be in the stomach. By 4 p. m., nausea, weakness and conjunctivitis were marked. At 6 o'clock, lacrimation and salivation were very marked and slight difficulty in respiration was noticed. An aqueous ephedrine spray was administered to the nose and throat several times and gave relief by midnight. At this time a very painful parotitis had developed. The next morning, both eyes were swollen from edema and there was severe conjunctivitis with lacrimation, parotitis was severe with marked salivation and a very severe frontal headache had developed. I was constrained to remain in bed for twenty-four hours. A slight papular rash appeared on the forehead but did not appear elsewhere and did not cause any symptoms and gradually cleared. A saline cathartic was taken about 1:30 p. m. of the 29th and fluids were pushed by mouth. The ephedrine spray was used in the nose and throat and in one week I was free from symptoms.

Severe skin eruptions with varying degrees of catarrhal involvement, mostly in the respiratory tract, or severe gastro-intestinal disturbances or both seem to be the most commonly reported symptoms of iodism. Neither of these was severe in my case. The striking features were conjunctivitis with edema of the eyelids and lacrimation, severe parotitis with salivation, severe frontal headache, and a slight edema of the larynx.

Chloriodized peanut oil contains about 27.5 per cent of iodine and 7.5 per cent of chlorine, making a total of 35 per cent halogens, in peanut oil. It has a high iodine value, a low specific gravity, a low content of free fatty acids, a low linolic acid, which is highly responsible for irritating action of iodized oils, and no free iodides. It is sufficiently heat stable to be sterilized by pasteurization.

It is only as the iodide that iodine is absorbed and causes iodism. Experimental and clinical evidence has shown that absorption from the bronchial mucous membrane is negligible. Thus the absorption must have been from the gastro-intestinal tract, excluding the possibility of idiosyncrasy. Frequent surface applications of tincture of iodine have been used without the slightest evidence of hypersensitiveness or idiosyncrasy. No iodides have been taken to my knowledge. The chloriodized peanut oil evidently entered the stomach by swallowing during the one spell of coughing during the introduction, because none was knowingly swallowed.

The following precautions are suggested: The patient should be instructed that none of the sputum should be swallowed during the procedure, nor afterward as long as the taste or smell of the oil is recognized. Films should be developed at once and if there is any considerable quantity of the iodized oil in the stomach it should be removed immediately by gastric lavage or induced vomiting and followed by a saline cathartic, and fluids by mouth should be pushed. In my own case a saline cathartic three hours afterward was not sufficiently antidotal.

This method of procedure should avoid this unpleasant experience in most cases.

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1. Ochsner, Alton: Wisconsin M. J. **25**: 544 (Nov.) 1926.

STUDIES ON COMMERCIAL BACTERIOPHAGE PRODUCTS

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AND
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Bacteriophage therapy is now being widely used for many types of bacterial infection. In the United States at the present time there are three well known pharmaceutic companies manufacturing bacteriophage and offering it to the medical profession. The present impartial study was undertaken to test these preparations in vitro to ascertain whether they contained genuine potent bacteriophages. It may serve as a guide to physicians who use such preparations and aid them in interpreting clinical results. Should a commercial product prove to contain a bacteriophage only feebly potent or one not capable of producing any lytic action, failure in therapy need not reflect on or injure the reputation of genuine bacteriophage.

The first company [1] markets a jelly described in the labels on tube and carton as an antigen containing

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1. The five following products were prepared by Eli Lilly & Co., designated above as the first company or as company 1. They were submitted to us, Oct. 30, 1931, and tested by us in January, 1932.

Streptococcus indifferent:	Lysed bacterial protein	Lot 37502
Streptococcus hemolyticus:	Lysed bacterial protein	Lot 37485B
Streptococcus viridans:	Lysed bacterial protein	Lot 36962B
B. coli:	Lysed bacterial protein	Lot 37228B

Staphylo jel. Expiration date on carton was May 15, 1932.

E. R. Squibb & Sons, designated the second company or as company 2, sent us one vial of polyvalent staphylococcus bacteriophage, Lot 46529, in October, 1931. It was tested in January, 1932. We purchased a second vial of the same product, Jan. 14, 1932, and tested it in March, 1932.

From Swan-Myers, division of Abbott Laboratories, designated the third company or as company 3, we purchased Bacteriophage Staph. Serial No. A 187121, marked on carton "Good until April 14, 1933." It was tested in January, 1932.

The Swan-Myers Bacteriophage Staph-coli, Serial No. A 2350, marked on carton "Good until Feb. 8, '32," was tested, Jan. 5, 1932.

lysed proteins of staphylococcus. In the accompanying literature, however, appears the definite statement that bacteriophage is present. There are also two more recent jel products of the same company, one for the streptococcus, the other for the colon bacillus. In addition, there is available for clinical trial, but not for sale, fluid filtrates for colon bacillus and for three types of streptococcus.

The second company produces a fluid filtrate of staphylococcus bacteriophage.

The third company makes two preparations, both liquid filtrates, one for the staphylococcus and one for the staphylococcus and the colon bacillus combined.

METHOD

Plain nutrient broth of p_H 7.6 was used throughout. To sterile tubes of this broth was added 0.5 cc. of the filtrate to be tested and 0.1 cc. of a broth bacterial suspension from twenty-four hour growth on agar slants. Suitable controls without bacteriophage were included. Incubation was at 32 C. with readings taken at intervals recorded in the tables. Filtrations were made at four hours for the staphylococcus and the colon bacillus, and at six hours for the streptococcus.

RESULTS

The first company's staphylococcus bacteriophage was tested for its action against a stock laboratory strain of bacteriophage-susceptible staphylococcus, designated as staphylococcus C, and of susceptible colon bacillus, coli C, as well as against Streptococcus viridans A, never heretofore lysed by bacteriophage. Successive filtrations were made after four hours incubation with staphylococcus C.

From table 1, it will be seen that this product as it is marketed can inhibit the growth of staphylococcus C, colon bacillus C, and Streptococcus viridans A. However, through successive filtrations, it loses its power to act against anything but staphylococcus. It is evidently a weak antistaphylococcus bacteriophage which

TABLE 1.—*Growth in Tubes, After Four Hours' and After Twenty-Four Hours' Incubation at 32 C., Inoculated with Company 1 Staphylococcus Bacteriophage*

	First Generation		Second Generation		Third Generation		Fourth Generation	
	4 Hrs.	24 Hrs.	4 Hrs.	24 Hrs.	4 Hrs.	24 Hrs.	4 Hrs.	24 Hrs.
Staphylococcus C								
With bacteriophage	0	0	3+	1+	4+	0	0	0
Without bacteriophage	4+	4+	4+	4+	4+	4+	4+	4+
B. coli C								
With bacteriophage	2+	4+	4+	4+	4+	4+	4+	4+
Without bacteriophage	4+	4+	4+	4+	4+	4+	4+	4+
Streptococcus viridans A								
With bacteriophage	0	0	4+	4+	4+	4+		
Without bacteriophage	4+	4+	4+	4+	4+	4+		

is amenable to being enhanced through successive contacts with a susceptible staphylococcus. The results suggested the presence of an antiseptic in the preparation. Through correspondence with company 1, it was found that an organomercury compound in 1:5,000 dilution was used as a preservative but that their tests showed that it caused "no deleterious action on the phage." If this is so, the product contains an extremely weak bacteriophage from the beginning, one not sufficiently potent to give the same clinical results as might be expected from a potent bacteriophage.

The preparation for the colon bacillus also showed the presence of an antiseptic. A colon bacteriophage was not recovered through five successive filtrations, but there was evidence of a weak staphylococcus bacteriophage.

The preparation for the streptococcus contained a high concentration of antiseptic. No streptococcus bacteriophage was detected in six successive filtrations.

TABLE 2.—*Growth in Tubes, After Six Hours' and Twenty-Four Hours' Incubation at 32 C., Inoculated with Company 1 Streptococcus Viridans Filtrate*

	First Generation		Second Generation		Third Generation		Fourth Generation	
	6 Hrs.	24 Hrs.	6 Hrs.	24 Hrs.	6 Hrs.	24 Hrs.	6 Hrs.	24 Hrs.
Streptococcus hemolyticus S								
With bacteriophage	0	0	0	0	0	0	2+	4+
Without bacteriophage	4+	4+	4+	4+	4+	4+	4+	4+
Streptococcus viridans G								
With bacteriophage	0	0	0	0	0	0	4+	4+
Without bacteriophage	4+	4+	4+	4+	4+	4+	4+	4+
Streptococcus viridans C								
With bacteriophage	0	0	0	0	0	0	4+	4+
Without bacteriophage	4+	4+	4+	4+	4+	4+	4+	4+
Streptococcus viridans M								
With bacteriophage	0	0	0	0	0	0	4+	4+
Without bacteriophage	4+	4+	4+	4+	4+	4+	4+	4+
Staphylococcus C								
With bacteriophage	0	0	0	0	0	0	4+*	4+*
Without bacteriophage	4+	4+	4+	4+	4+	4+	4+	4+
B. coli C								
With bacteriophage	0	0	0	0	0	0	4+	4+
Without bacteriophage	4+	4+	4+	4+	4+	4+	4+	4+

* These tubes with bacteriophage grew more heavily than the controls.

The three fluid filtrates for Streptococcus hemolyticus, Streptococcus viridans, and indifferent streptococcus offered for clinical trial by company 1, were tested against a stock hemolytic streptococcus, which we shall designate as strain S, susceptible to lysis only by a specific bacteriophage; a Streptococcus viridans, strain G, recently isolated from a subacute bacterial endocarditis; and two other strains of Streptococcus viridans, designated as C and M, also isolated from cases of endocarditis. For comparison, Staphylococcus C and colon bacillus C, previously described, were used. Table 2 illustrates the results.

With the use of identical strains and under like conditions, the filtrates of Streptococcus hemolyticus and indifferent streptococcus were tested. The results were so nearly comparable with those of the Streptococcus viridans filtrate that table 2 will serve to illustrate the results for all three. We found that the filtrates seemed completely to lyse all the described organisms in six hours, surprisingly enough, since none of these streptococcus strains had ever been lysed before by any bacteriophage. Complete inhibition of growth was still noted at the end of seventy-two hours. Bearing in mind that a genuine bacteriophage is indefinitely transmissible in series, we tested a second generation. The same result was found, complete clearing in all tubes, including the staphylococcus and the colon bacillus. The controls, without filtrates, grew abundantly in each case. Since lysis of the staphylococcus and the colon bacillus by the streptococcus filtrates seemed inconsistent with the idea that the effect could be due to a specific streptococcus bacteriophage, the cause of such clearing required further investigation. Successive generations were made with each filtrate against each strain. The

results of the second and third generations were comparable to those of the first—complete clearing of all tubes. The fourth generation, however, was disappointing, since no clearing of any of the tubes was recognizable. Each tube gave a growth as heavy as its control which contained no filtrate. A fifth generation confirmed the results of the preceding one, all tubes again remaining cloudy. Such a result would lead to the conclusion that the inhibition of growth was due to some factor other than the lytic principle. These results could be explained only by the presence of an antiseptic in the original material.

Frisbee and MacNeal [2] have shown that the presence of antiseptics such as formaldehyde and acriflavine are distinctly unfavorable to the action of bacteriophage. D'Herelle [3] pointed out that antiseptics such as sodium fluoride in a bouillon medium modify the state of bacteria and thus interfere with the operation of the bacteriophage. Wolff and Janzen [4] have shown that no bacteriophage action is possible in the presence of quinine derivatives, even if these substances are added in quantities so small that bacteria are killed only after an appreciable interval. Although lysis is lacking, bacteriophage is not destroyed but remains inert. It is

TABLE 3.—*Growth in Tubes, After Four Hours' and After Twenty-Four Hours' Incubation at 32 C., Inoculated with Company 2 Staphylococcus Phage*

	First Generation		Second Generation		Third Generation		Fourth Generation	
	4 Hrs.	24 Hrs.	4 Hrs.	24 Hrs.	4 Hrs.	24 Hrs.	4 Hrs.	24 Hrs.
Staphylococcus C								
With bacteriophage	4+	2+	4+	3+	0	4+	0	1+
Without bacteriophage	4+	4+	4+	4+	4+	4+	4+	4+
B. coli C								
With bacteriophage	4+	4+	4+	4+	0	3+	1+	2+
Without bacteriophage	4+	4+	4+	4+	4+	4+	4+	4+
Streptococcus viridans A								
With bacteriophage	4+	4+	4+	4+	4+	4+		
Without bacteriophage	4+	4+	4+	4+	4+	4+		

because of these results that we feel that antiseptics are deleterious to the action of bacteriophage.

In the same manner, fluid staphylococcus bacteriophage of the second company was tested with the identical strains employed in the experiments already described with the staphylococcus bacteriophage of the first company. The results are indicated in table 3. From these tabulated results it is evident that the product as offered for sale is a weak staphylococcus bacteriophage containing no antiseptic. It attacks neither the colon bacillus nor the streptococcus. After several successive filtrations, the potency of the bacteriophage is increased. When this occurs, the bacteriophage is then active also against the colon bacillus. This is a characteristic of our stock staphylococcus bacteriophage which was sent on request to company 2 during the summer of 1931.

A second bottle of company 2 staphylococcus bacteriophage was purchased several months later for retest. It gave an entirely different picture. This bottle contained a potent staphylococcus bacteriophage of titer 10^{-7} to 10^{-8}. Furthermore, even after three successive contacts with colon bacillus C, there was no evidence of lysis for this organism. It is therefore not a question merely of a difference in potency between these two batches of bacteriophage but probably the substitution of a different race of bacteriophage. If the standard varies so much from time to time, how is the physician to know whether he is using a powerful preparation or merely a tube of broth?

The fluid staphylococcus bacteriophage of the third company revealed a genuine and potent bacteriophage which lysed only the staphylococcus. This preparation contained no preservative. Its titer was 10^{-2} in four hours and 10^{-7} in twenty-four and forty-eight hours, as compared with 10^{-4} in four hours and 10^{-9} in twenty-four and forty-eight hours for our stock staphylococcus bacteriophage. Although the titer of company 3 bacteriophage is lower than ours, it is still a very good bacteriophage. Our experiments, of course, do not reveal either the degree of polyvalence or the therapeutic efficacy of this preparation.

Surprisingly enough, the staphylococcus-colon bacteriophage marketed by this company revealed nothing more than a poor colon bacteriophage. None of the potent staphylococcus bacteriophage previously described was recovered from this mixture, although successive filtrations were made. The weak colon bacteriophage was transmissible in series and could be enhanced slightly in four successive filtrations. It never was able to clear completely for twenty-four hours the very susceptible colon strain C, for which we have thirty separate colon bacteriophages, all of which clear it twenty-four hours or longer.

The use of an antiseptic as a preservative for bacteriophage is improper, in our opinion. It must be borne in mind that bacteriophage closely resembles a living thing and may be destroyed by an agent powerful enough to kill bacteria. If an antiseptic is diluted to the point at which it no longer destroys but still inhibits bacterial growth, it may also inhibit the action of bacteriophage. Further, a bacteriophage exposed to the action of such an antiseptic may tend to lose its potency. Company 1, in a booklet for January and February, 1932, states that a preservative is present in its bacteriophage preparations but illogically warns that no antiseptic should be used during treatment with phage.

Jamieson and Powell [5] have reported tests running for a year which proved that bacteriophage was not markedly affected by a 1:5,000 dilution of merthiolate. Tests performed in our laboratory showed that in this concentration of this antiseptic neither staphylococcus C nor colon bacillus C could grow, so that any possible effect on the corresponding bacteriophages was not disclosed. Even when only a single drop of 1:5,000 dilution of this drug was added to a tube of broth, the fluid medium was rendered unfit for the multiplication of these bacteria, no visible clouding taking place. That the bacteriophage is considerably affected by one drop of 1:5,000 dilution of the antiseptic is shown on agar plates streaked with one loopful from each tube in a series after the tubes had been incubated for two and one-half, five and twenty-four hours. The results are evident in table 4. A comparison of the readings with and without antiseptic will reveal how great an inhibition of bacteriophage it causes. Further work with the antiseptic is being carried out. In the meantime we can only point to the facts, which show that by the methods employed by company 1 it was not possible to produce potent bacteriophage.

2. Frisbee, F. C., and MacNeal, W. J.: J. Infect. Dis. **46**: 405 (May) 1930.
3. d'Herelle, Felix: The Bacteriophage and Its Behavior, Baltimore, Williams and Wilkins Company, 1926, p. 72.
4. Wolff, L. K., and Janzen, J. W.: Compt. rend. Soc. de biol. **87**: 1087 (May) 1922.
5. Jamieson, W. A., and Powell, H. M.: Am. J. Hyg. **14**: 218 (July) 1931.

Our clinical experience leads us to believe that little or no benefit is to be expected from bacteriophage therapy when the bacteriophage used is not potent or does not lyse the strains causing the infection. Furthermore, the use of stock bacteriophages is limited. With infections due to the staphylococcus, it is possible to use a stock preparation because there is a staphylococcus bacteriophage which attacks the great majority of staphylococci. There are exceptions, however, and in such cases it is necessary to prepare a specific bacteriophage. As no bacteriophages exist which are sufficiently polyvalent for most members of the colon bacillus and streptococcus species, specific bacteriophages must usually be made for the particular infecting strain of the individual patient.

For bacteriophage therapy to be intelligently applied, close cooperation between the clinic and the laboratory is essential. Cultures of specimens from patients must be taken to determine the causative bacteria. The organism must then be tested for its susceptibility to bacteriophage, and often a specific bacteriophage has to be prepared. Haphazard application of stock preparations to any infection whatever cannot be expected to yield anything but haphazard results.

Cooperation with the laboratory is also necessary if any progress is to be made in the study of the action

TABLE 4.—*Growth on Plate Cultures of Staphylococcus C Made from Broth Cultures After Two and One-Half Hours, Five Hours and Twenty-Four Hours Incubation of the Tubes at 32 C.*

	2½ Hours	5 Hours	24 Hours
From tubes to which one drop of 1:5,000 Merthiolate had been added			
With bacteriophage	+	+	0
Without bacteriophage	++	++	+
From tubes to which no antiseptic was added			
With bacteriophage	±	0	0
Without bacteriophage	++	+++	+++

of bacteriophage in the body. The duties of the laboratory do not cease with the preparation of bacteriophage. In a measure, they may be said to begin here. A careful follow up of specimens before, during and after treatment with bacteriophage should be made. Variations in susceptibility of the organism to bacteriophage often take place during the course of a disease, and a new specific bacteriophage may be required. Only through such studies can one hope to come to correct conclusions as to the value of bacteriophage therapy and to learn the most effective methods for the therapeutic use of the agents in this category.

CONCLUSIONS

One commerical company markets a bacteriophage preparation containing a preservative, which does not belong in a bacteriophage. Its preparation for staphylococcus contained a weak bacteriophage. In the streptococcus filtrates for clinical trial as well as in the streptococcus and colon bacillus products offered for sale, the presence of bacteriophage could not be detected by us.

The second company's staphylococcus bacteriophage contains no preservative. A first sample revealed a weak bacteriophage but a later batch contained a potent staphylococcus bacteriophage.

The third company's staphylococcus bacteriophage has no preservative and is potent, but its staphylocolon mixture is only a poor colon bacteriophage.

303 East Twentieth Street.

Clinical Notes, Suggestions and New Instruments

FRACTURE OF THE ANTERIOR SUPERIOR SPINE OF THE ILIUM

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Up to 1924, Carp[1] collected twenty-one cases (including his own) of fracture of the anterior superior spine of the ilium. Two other cases have been found, which were not referred to in Carp's article. In 1867, Bousseau[2] reported a case in which both the anterior superior and anterior inferior spines of the ilium were fractured at the age of 15 years. Since this injury was caused by the passage of a wagon, it is scarcely eligible to this series. In 1914, von Saar[3] reported a case in a person, aged 18 years, who was hurt while skiing. Since the publication of Carp's paper, twenty-two additional cases have appeared in the literature.[4] My case, accordingly, makes the forty-fifth to be reported.

The etiology of muscular avulsion of the anterior superior spine is of interest. Carp found the average age of his patients to be 17½ years. In the epiphyseal stage the youngest patient was 15 and the oldest 23. Carp also had one patient, aged 70. The average age in ten of the twenty-three recent cases was 16 years. All but one of Carp's cases were in males, while at least three of the recent cases were in females. All of Carp's patients had pain, and a snap was felt in 45 per cent of them. The etiology as analyzed by Carp was "running vigorously, 50 per cent; 'take off,' 16 per cent; running over uneven ground, 9 per cent; sudden turn backward, 5 per cent; rising out of seat, 5 per cent; slipping, 5 per cent; wrestling on sloping ground, 5 per cent; kicking, 5 per cent." Among the more recent cases the following etiologies are mentioned: "kicking football, running 100 yard dash, running, running and jumping (two cases), skiing, sudden movement, sudden incoordinated movement combined with internal rotation, running race, muscular violence." Kleinschmidt[4] classes the cases into two groups according to etiology: first (nine cases of his series), those in which the fracture occurs as the result of a defense motion—the sudden backward tension of certain muscle groups; second (five cases of his series), those in which there is no sudden movement change but the regular machine-like movements of the short sprints.

According to Köhler,[5] the anterior superior spine unites at 22 years; according to Carp, at 25 years. Practically all the cases have occurred in persons in the epiphyseal stage. The muscles having attachment to the anterior superior spine of the ileum are the tensor fasciae latae and the sartorius. The action of the former muscle is "to tense the fascia lata and at the same time to flex the thigh and rotate it slightly inward."[6] The action of the latter is "to flex the thigh and leg and to rotate the thigh outward; when the leg is flexed, the muscle will assist in rotating the thigh inward."[6] Moreover, as pointed out by Kleinschmidt, Poupart's ligament is attached to the

1. Carp, Louis: Ann. Surg. **79:** 551 (April) 1924.
2. Bousseau, quoted by Stimson: Bull. Soc. anat., 1867, p. 283.
3. von Saar, G.: Neue deutsche Chir. **13,** 1914.
4. These were reported by:
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Nekula, R.: Časop. lék. česk. **64:** 1204 (Aug. 15) 1925.
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Roegholt, M. N.: Nederl. Maandschr. v. geneesk. **13:** 288, 1925.
Akin, O. F., and Carlson, C. E.: M. Sentinel **35:** 431 (July) 1927.
Karfiol, Georg: Zentralbl. f. Chir. **57:** 789 (March 29) 1930.
Löhr: Deutsche med. Wchnschr. **56:** 958 (June 6) 1930.
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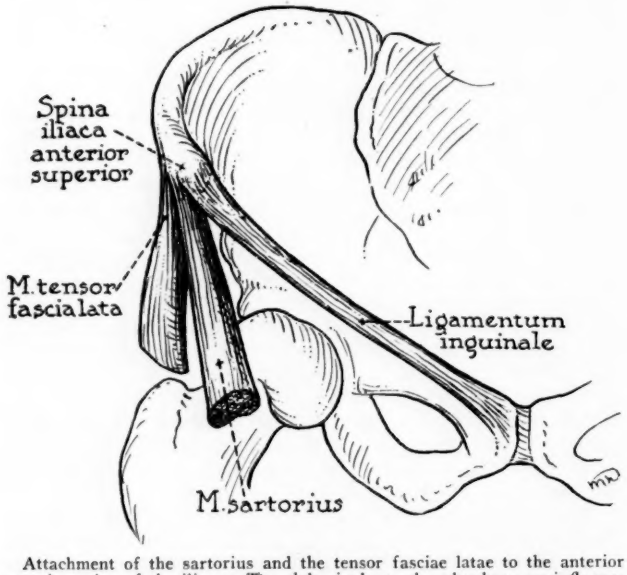
Pezcoller, A.: Osp. maggiore **19:** 93 (Feb.) 1931; Clin. chir. **34:** 249 (March) 1931.
Turco, Adalgiss: Policlinico (sez. prat.) **38:** 1308 (Sept. 7) 1931.
Kleinschmidt, Hans: Deutsche med. Wchnschr. **57:** 1895 (Nov. 6) 1931.
Losinsky, L. I.: Ortop. i. travmatol. **5:** 70, 1931.
Ebert, Karl: München. med. Wchnschr. **78:** 27 (Jan. 2) 1931.
Siebner, M.: Chirurg. **3:** 59 (Jan. 15) 1931.
Hanke, Hans: Chirurg **4:** 23 (Jan. 1) 1932.
5. Köhler, A.: Grenzen des Normalen und Anfänge des Pathologischen im Roentgenbilde, ed. 3, 1920 (quoted by Hanke[4]).
6. Piersol, G. A.: Human Anatomy, Philadelphia, J. B. Lippincott Company, 1907.

anterior superior spine and to this ligament are attached the external oblique, the internal oblique and the transversalis muscles and the fascia lata. This author also believes that the gluteus medius and the iliacus muscles exert an influence on the anterior superior spine. Heller [4] believes that sacralization of the fifth lumbar vertebra has an important bearing on this fracture because it interferes with rotation of the fifth lumbar. In this connection it is of interest to note that cases have been reported of fractures by muscular violence of the anterior inferior spine.[7]

The diagnosis of fracture of the anterior superior iliac spine is based on the youth of the patient (from 14 to 25 years), the history of running a race or a sudden twist, and localized tenderness over the affected anterior superior spine. A movable or fixed fragment often may be felt just below the anterior superior spine. Efforts to flex the thigh are painful. The diagnosis is confirmed by roentgen examination.

As Cotton [8] says, "The lesion seems not to be one of any gravity as to end-results." Böhler [9] says that in these fractures, in which there is considerable displacement, they "can be reduced by an open operation." Carp, however, found that the average duration of disability in nine cases in which operation was not performed was twenty days, whereas in the two cases in which operation was performed the disability was one



Attachment of the sartorius and the tensor fasciae latae to the anterior superior spine of the ilium. The abdominal muscles also have an influence on the spine because of their attachment to Poupart's ligament.

month. The end-result was excellent in all. The best treatment probably is rest in bed with the thigh in flexion for two or three weeks, with gradual slow resumption of activities.

REPORT OF CASE

The following is the report of a case of fracture of the right anterior superior spine of the ilium by muscular violence:

F. U., a boy, aged 15 years, well developed and muscular, who was very proficient in competitive athletics, for some time (five weeks) previous to his accident noticed some pain and tenderness in the region of the anterior superior spines and crests of both iliac bones. May 7, 1932, the day of the accident, the boy had run in the 50 yard, the 100 yard and the 220 yard dashes and in the rest following these races he had become cooled off. Thereafter, he started the 120 yard low hurdle race without "warming up." His method of taking the hurdle involved sending the right leg over first and following with the left. After he had passed over the second hurdle and his right foot was on the ground and he was stepping forward with his left foot, he experienced a sudden severe pain and snap in the anterior superior spine of the right ilium and collapsed on the track. At the time of the injury, the right thigh was apparently hyperextended. He was carried from the field in considerable pain. The patient was first seen at his home the following day. He was lying in bed in the position he had discovered to be most comfortable; namely, with the thigh flexed on a pillow. There was marked tenderness in the region of the right anterior superior spine and immediately below it. There was considerable swelling. The patient was unable to flex the thigh because of extreme pain in the region of the right anterior superior spine. There was also some tenderness and pain in the region of the left anterior superior spine. The treatment consisted merely of bed rest for fourteen days, with the thigh in the semiflexed position. The patient was permitted to walk to the bathroom with the thigh flexed. May 21, two weeks after the accident, the patient walked into the office greatly improved. He was able to flex the thigh without pain. The displaced anterior superior spine of the ilium was easily palpated about 1.5 to 2 cm. below its customary situation. The roentgen examination showed the detached fragment and what appeared to be callus between it and the ilium. When seen, June 15, five and one-half weeks after the accident, there was no pain and the patient said he could "do anything." There was no pain on ascending stairs, running or swimming, and no limp. He had not been conscious of his trouble for the last two weeks. Examination disclosed a firm hard bony swelling below the anterior spine. This swelling was not tender. Movements of the thigh occasioned no pain. The roentgen examination showed considerable new bone formation. Although the patient was symptomatically cured, he was advised to refrain from the most violent activities for another month.

COMMENT

In this case it is not improbable that the muscles, which had not previously been "warmed up" by a little running, were less elastic and hence may have produced a more violent pull on the bony attachment. If this is a factor in this accident, it would seem wise for coaches to insist on preliminary "warming up" before permitting young athletes in the epiphyseal stage to engage in sprints or hurdle races.

723 Elm Street.

7. Whitelocke, quoted by Stimson and by Carp: Lancet, Nov. 25, 1893. Corlette, C. E.: M. J. Australia **2**: 682 (Nov. 12) 1927.
8. Cotton, F. J.: Dislocations and Joint Fractures, ed. 2, Philadelphia, W. B. Saunders Company, 1924, p. 467.
9. Böhler, L.: Treatment of Fractures, Vienna, William Maudrich, 1929, p. 63.

BACILLUS WELCHII INFECTION

PRESTON NOWLIN, M.D., AND E. R. HIPP, M.D.
CHARLOTTE, N. C.

Infection with B. welchii as the causative organism is of infrequent occurrence in civil practice. Such cases as are seen are generally those in which marked tissue damage has taken place and in which the wound has been grossly contaminated, as in street accidents and in gunshot wounds. The case reported here is of unusual interest because of the probable portal of entry of the infection and on account of the fact that it developed in apparently normal muscle tissue.

A. J., a white man, aged 46, seen, April 30, 1932, complained chiefly of hemorrhoids. His family and past history presented nothing of importance except for the history of mild alcoholism during the past few weeks. The patient was well developed, rather obese, and somewhat under the influence of alcohol. Examination of the chest and abdomen presented no abnormalities. Rectal examination showed a large cluster of protruding externo-internal hemorrhoids with a mild associated proctitis.

May 4, after four days of rest in bed and palliative treatment, the patient was prepared for operation. The usual preoperative morphine was given and under a low spinal anesthesia the hemorrhoidal masses were resected and the wounds closed loosely with chromic catgut.

During the first twelve hours after operation morphine was used freely for pain and on one occasion morphine with 2 cc. of 25 per cent magnesium sulphate was given. All these injections were given in the deltoid region of the right arm. Ten hours after operation, rather severe pain was noted in the right arm at the site of the hypodermic injections and the temperature rose to 102 F. On the morning of the first day after operation the pain had increased in severity, the temperature was 104, and the pulse rate was 140 and of good volume. There was tenderness and some induration in the arm, but no crepitation.

At 2 p. m. of the same day the patient showed evidence of severe shock, the pulse was extremely rapid and barely palpable,

the temperature was 104.4, and the arm showed widespread crepitation extending from the scapular region of the right shoulder to below the elbow. Immediately the arm and shoulder were widely incised and there was an escape of foul smelling gas and a small amount of serosanguineous fluid. The muscles of the arm and shoulder were discolored and elevated from the underlying bone. Tubes were placed in the wound and 100 units of concentrated perfringens antitoxin was given intravenously. Smears and cultures showed the presence of B. welchii in large numbers.

Despite supportive treatment and further administration of antitoxin both intramuscularly and intravenously, the infection rapidly extended into the right pectoral and right infrascapular regions and the patient died on the evening of the second postoperative day, fifty-six hours after operation, death occurring from an overwhelming toxemia.

Nalle Clinic, 412 North Church Street.

SUCCESSFUL CARDIORRHAPHY

WALLACE SPIGEL, M.D., NORFOLK, VA.

Of the numerous stab and gunshot wound cases admitted to the surgical clinic service at St. Vincent's Hospital, relatively few involve the heart. The successful suture of a wound of the heart is not an uncommon surgical feat. To the individual surgeon, however, the experience of performing the operation is rare, and the subject receives but little consideration until the occasion presents itself.

The first attempted suture of a wound of the heart in a human being was by Cappelan of Christiania in 1895. Within ten years a statistical study revealed 38.75 per cent of recoveries in 160 cases. These figures have steadily improved. Tuffier, in 1920, compiled a total of 305 cases with 50.4 per cent of recoveries. Ballance, between 1912 and 1920, found 152 cases with 68.4 per cent of recoveries. Cutler, in 1932, reported a survey of patients operated on between 1920 and 1926, a total of twenty-eight, with 68.4 per cent of recoveries.

Before the time of Ambroise Paré (1509-1590), heart injuries were thought to be always fatal. He observed that this was not true and reported the case of a duelist who received a heart injury and pursued his opponent several yards. In 1868 Fischer collected all published reports of human heart injuries, 452, and showed that many of the patients lived several hours, some for days, and that 10 per cent recovered. John B. Roberts, in 1881, before the Anatomical and Surgical Society of Brooklyn, suggested the advisability of suturing human heart wounds. In 1882, Bolck of Copenhagen demonstrated the feasibility of suturing cardiac wounds in animals. Farina, Cappelan and Rehn sutured wounds of human hearts. Rehn's patient recovered; Farina's patient lived six days and died of pneumonia. In 1901, Nietert reported the first two American cases. Vaughan reported another and collected reports of twenty-six cases from the literature.

A review of the literature shows that the best methods of exposure are, first, removal of two or more ribs and costal cartilages subperiosteally; second, hinged flaps consisting of skin, muscles, ribs and possibly a portion of the sternum; third, median sternotomy, and, fourth, intercostochondral thoractomy; that is, two, three or four costal cartilages are divided near the sternum and the ribs retracted until sufficient exposure is obtained. The last two methods are the best. Median sternotomy has the advantage of exposing the heart without entering either pleural cavity; however, in most injuries the pleural cavity has already been penetrated. The value of the method of Beck, which places a stay suture through the apex of the heart, is helpful in closing heart defects.

Death most frequently occurs promptly, as the result of shock, hemorrhage and "herz tamponade," before any treatment can be instituted. The classic symptoms described many years ago include an anxious expression with restlessness; the patient may be unconscious; there is marked shock with pallor and cyanosis; the skin is covered with cold sweat; and there is usually dyspnea, the pulse being feeble and fast. The physical examination shows a wound over the precordium, which frequently does not bleed extensively. There may be evidence of pneumothorax or hemopneumothorax. The precordial area of dulness may or may not be increased in size. The apex impulse is altered. The heart sounds are usually distant.

The diagnosis of cardiac injuries is not always easy, the diagnosis being made on symptoms that may be readily confused with and present a picture almost identical to that of pulmonary, pleural and pericardial injuries.

The surgical treatment should be prompt, even in the face of many usually definite contraindications to surgical intervention. It is felt that the gravity of heart injuries demands exploration, because, as may be seen by the figures that have been presented, prompt intervention has reduced the mortality of heart injuries from about 63 per cent, reported in the first series in 1909, to approximately 30 per cent at this time.

REPORT OF CASE

J. C., a Negro, aged 25, was brought into the emergency room of St. Vincent's Hospital, Sunday morning, Aug. 20, 1932. His clothes were drenched with blood, particularly his shirt, which was torn. He was sweating profusely. The pulse could not be felt in either the arms or the feet; the extremities were cold; the blood pressure could not be obtained, and, in general he presented a typical picture of extreme shock. Respiration was slow and gasping, with an exaggerated apneic period. The heart sounds were not audible. However, by inserting the finger tip through the third intercostal space one could feel an irregular and weak beat, the rate being approximately thirty per minute. When the shirt was removed, a wound two inches long was apparent over the left side of the chest at about the level of the lower border of the second rib. The farther end of the wound was about 7 cm. from the midsternal line.

Under light ether anesthesia, the stab wound was enlarged transversely over the lower border of the second rib to the midclavicular line, and a perpendicular incision along the edge of the sternum down to the fifth rib was made. A portion of the third and fourth costal cartilages was removed. The pericardium was partially filled with blood and the left lung was entirely collapsed. With each feeble beat of the heart, blood welled up into the incision from under the sternum. Palpation under the sternum revealed a tear in the left auricle about an inch long. This was sutured with number 2 chromic catgut, a continuous suture and then a mattress suture being used. The instant the laceration was closed the heart beats became stronger, with a gradual rise in blood pressure. Within a minute the blood pressure was sufficient to cause hemorrhage of the arteries and veins in the incision. The wound was closed with one Penrose drain.

While the patient was on the operating table, 1,000 cc. of saline solution was given intravenously. The pulse rate before the patient left the operating room was 100. About two hours after the operation, a blood transfusion of 500 cc. was given

At 6 p. m., about six hours after the operation, the blood pressure was 90 systolic, 60 diastolic; at midnight, 120/68; the second day, 124/64; the third day, 138/76; the fifth day, 128/68. After the sixth day the blood pressure remained stationary at 110/70. No heart stimulants were given.

Daily examination of the chest revealed absence of breath sounds on the left side and dulness over the entire left chest. The respiratory rate varied from 38 to 60. Roentgen examination of the chest, August 29, revealed marked, diffuse increased density involving the entire left chest with obliteration of the diaphragm shadow, costophrenic angle and lung markings. The heart, trachea and mediastinum were displaced toward the right. The right lung showed considerable increase in lung markings, evidently caused by passive congestion. Radiographically, the observations were indicative of left pleural effusion.

August 30, following the roentgen examination, 32 ounces (945 cc.) of bloody fluid was removed from the left chest. The respiratory rate was somewhat lessened. September 2, 8 ounces (235 cc.) was removed, following which the respiratory rate became normal and breath sounds were audible in the left chest for the first time.

The postoperative course following the last thoracentesis was uneventful and the patient was discharged from the hospital at the end of the third week in excellent condition.

On the twenty-third day the patient walked about a mile to the office without any signs of fatigue or circulatory distress.

Medical Arts Building.

Committee on Foods

RULES AND REGULATIONS

THE COMMITTEE HAS AUTHORIZED PUBLICATION OF THE FOLLOWING AMENDMENT TO ITS RULES AND REGULATIONS.

RAYMOND HERTWIG, Secretary.

AMENDMENT OF RULES GOVERNING PACKAGE LABEL AND ADVERTISING

Rule one of the "Rules Governing Package Label and Advertising" (Rules and Regulations, September, 1932, page ten) has been amended by addition of the phrase "arranged in the order of their decreasing proportions by weight in the food and." The Rule now reads:

A food may bear a distinctive, fanciful or brand name which is not misleading or deceptive by implication. The common name of the food or a descriptive statement of the identity of its ingredients arranged in the order of their decreasing proportions by weight in the food and in easily legible type must appear in proximity to the trade name on the label and in advertising if such be deemed in the interest or welfare of the public or physicians, or necessary to avoid improper or unethical merchandising practices. The description shall be such as to prevent deception or false implication by the color, flavor, structure, form, appearance or other characteristic of the article and shall mention any unusual or unexpected ingredient.

REPORTS OF THE COMMITTEE

THE FOLLOWING PRODUCTS HAVE BEEN ACCEPTED BY THE COMMITTEE ON FOODS OF THE AMERICAN MEDICAL ASSOCIATION FOLLOWING ANY NECESSARY CORRECTIONS OF THE LABELS AND ADVERTISING TO CONFORM TO THE RULES AND REGULATIONS. THESE PRODUCTS ARE APPROVED FOR ADVERTISING IN THE PUBLICATIONS OF THE AMERICAN MEDICAL ASSOCIATION, AND FOR GENERAL PROMULGATION TO THE PUBLIC. THEY WILL BE INCLUDED IN THE BOOK OF ACCEPTED FOODS TO BE PUBLISHED BY THE AMERICAN MEDICAL ASSOCIATION.

RAYMOND HERTWIG, Secretary.

QUAKER PEARL HOMINY

Manufacturer.—The Quaker Oats Company, Chicago.

Description.—Coarse cracked and pearled white Indian corn grits containing practically no bran or germ.

Manufacture.—See this section for Quaker White Cornmeal (THE JOURNAL, Jan. 7, 1933, p. 43). The "flinty, coarse granular material" is "pearled," the finer portion is bolted out, and the larger grits are packed in cartons under the brand name "Quaker Pearl Hominy."

Analysis (submitted by manufacturer).—

	per cent
Moisture	11.6
Ash	0.5
Fat (ether extraction method)	1.0
Protein (N × 6.25)	9.1
Crude fiber	0.6
Carbohydrates other than crude fiber (by difference)	77.2

Calories.—3.5 per gram; 99 per ounce.

Claims of Manufacturer.—A coarse cracked and pearled hominy for all table uses.

CORINNIS WAUKESHA PURE SPRING WATER

Distributor.—Hinckley and Schmitt, Chicago.

Description.—A bottled spring water of low mineral content practically free of micro-organisms.

Collection and Bottling.—Corinnis Water is obtained from the White Rock Mineral Springs at Waukesha, Wis. The property is kept in strictly sanitary condition. The several springs flow to the surface through limestone and underlying sandstone. In order to avoid contamination from any surface water the Corinnis Water is taken from the springs at a considerable depth and comes to the surface through a wrought iron pipe. It is thoroughly aerated and stored in a paraffin treated concrete reservoir, from which it is pumped through filters to remove any suspended material. The filtered water passes through an ultraviolet ray unit into clean tank cars through a specially devised cover.

The sanitation of the tank cars is very carefully supervised. The emptied car is sealed at Chicago, where the water is bottled, to prevent contamination during transit. At Waukesha the car is opened, scrubbed inside with a brush, rinsed out with water and treated with chlorine gas. The car is filled to overflowing with the spring water. A sample is taken for bacteriologic examination and the car is sealed and delivered to Chicago within twenty-four hours. The water is stored in glass lined tanks until bottled. The water passes from the tanks through an ultraviolet ray machine to the bottling machines. The bottles used are cleaned by washing with 5 per cent sulphuric acid solution, are immersed for eight minutes in 5 per cent sodium hydroxide solution (54 to 60 C.) and then thoroughly rinsed eight times with water. The filled bottle is capped with a cellulose seal to eliminate possibility of contamination before being opened by the consumer.

Analysis (submitted by manufacturer).

Sanitary Analysis	
Appearance	Clear
Color	None
Sediment	None
	Parts per million
Nitrite nitrogen	0.002
Nitrate nitrogen	0.060
Ammonia nitrogen	0.060
Albuminoid nitrogen	0.014
Oxygen consumed	0.6
Chemical Analysis	
Total solids	340.0
Mineral matter	306.0
Organic and volatile matter	34.0
Hardness before boiling, as $CaCO_3$	220.0
Hardness after boiling, as $CaCO_3$	47.0
Sulphuric anhydride (SO_3)	45.3
Silica (SiO_2)	7.0
Chlorine in chlorides	8.0
Iron and aluminum oxides	2.4
Iron (Fe)	0.1
Calcium (Ca)	66.7
Magnesium (Mg.)	23.8
Lithium	trace
Reaction after boiling	faintly alkaline

Micro-Organisms.—(Average of fifty examinations of samples taken at the source).

Bacteria per cubic centimeter:

At 37 C. in 24 hours	0.1
At 20 C. in 48 hours	0.6

B. coli test, fermentation in lactose broth for seventy-two hours—negative.

(Average of one hundred examinations of samples taken from tank cars):

Bacteria per cubic centimeter:

At 37 C. in 24 hours	0.5
At 20 C. in 48 hours	0.8

B. coli test, fermentation in lactose broth for seventy-two hours—negative.

Official plate count, 4 bacteria per cubic centimeter.

Tests showed no acid nor gas produced with lactose broth.

Claims of Manufacturer.—This bottled pure faintly alkaline low mineral content spring water is for all table and drinking uses.

JELL-WELL PLAIN GELATINE

Distributor.—Jell-well Dessert Company, Ltd., Los Angeles.

Description.—Plain granulated gelatin.

Manufacture.—An accepted gelatin prepared as outlined in THE JOURNAL, Feb. 27, 1932, page 737, is automatically sealed in envelops and packed in cartons.

Analysis (submitted by manufacturer).—

	per cent
Moisture	10.2
Ash	1.7
Sodium chloride	1.0
Fat (ether extract)	0.1
Protein (N × 5.55)	87.0
	parts per million
Lead (Pb)	0.0
Zinc (Zn)	less than 10
Copper (Cu)	less than 5
Sulphur dioxide	0.0
Arsenic (As_2O_3)	less than 0.3

Calories.—3.5 per gram; 99 per ounce.

Micro-Organisms.—Average less than 1,000 per gram; contains no B. coli, gas forming bacteria, liquefiers or molds.

Claims of Manufacturer.—For all table uses of gelatin and for special diets.

BRER RABBIT PURE NEW ORLEANS MOLASSES (GOLD LABEL)

(Contains Sulphur Dioxide)

Manufacturer.—Penick and Ford, Ltd., New Orleans.

Description.—Pasteurized New Orleans molasses taken from the first crystallization liquor in the preparation of cane sugar; treated with sulphur dioxide.

Manufacture.—The cane syrup described for Brer Rabbit Pure Sugar Cane Syrup (THE JOURNAL, Jan. 7, 1933, p. 43) is concentrated by boiling. The cane sugar is partially crystallized out. The mass of crystals is removed by centrifugation. The liquid portion separated from the crystals, called "first A molasses," is heated to 80 C. and automatically filled into tins, which are not cooled and therefore remain hot for a considerable time.

Analysis (submitted by manufacturer).—

	per cent
Moisture	22.2
Ash	3.6
Fat (ether extract)	0.0
Protein (N × 6.25)	0.5
Reducing sugars as invert	25.1
Reducing sugars after inversion (as invert)	70.4
Sucrose (copper reduction method)	43.1
Carbohydrates (by difference)	73.7
Iron (Fe)	0.005
Calcium (Ca)	0.15
Sulphur dioxide (mg. per kilogram)	195

Calories.—3.0 per gram; 85 per ounce.

Claims of Manufacturer.—The molasses is for all table, cooking and baking uses.

PRUDENCE BEEF STEW

Manufacturer.—Boston Food Products Company, Boston.

Description.—Canned beef stew containing cooked beef, potatoes, carrots, onions, salt and pepper.

Manufacture.—United States Department of Agriculture inspected beef is trimmed of gristle, skin and sinews, placed in cold water and boiled until tender. It is taken from the kettle, again overhauled for skin, gristle or sinews, and then diced.

The vegetables used are pared by machine, washed, sliced, and in definite proportions admixed with the cooked beef. The mixture is filled into cans and processed.

Analysis (submitted by manufacturer).—

	per cent
Moisture	81.1
Total solids	18.9
Ash	1.6
Fat (ether extract)	1.2
Protein (N × 6.25)	8.9
Reducing sugars before inversion as dextrose	0.6
Sucrose (copper reduction method)	0.4
Crude fiber	0.3
Starch (acid hydrolysis method)	4.0
Carbohydrates other than crude fiber (by difference)	6.9

Calories.—1.0 per gram; 28 per ounce.

Claims of Manufacturer.—This beef stew is for all table uses.

ARBITRATOR PATENT FLOUR. PHOSPHATE ADDED (BLEACHED)

Manufacturer.—Saxony Mills, St. Louis.

Description.—Soft winter wheat patent flour with 0.5 per cent added monocalcium acid phosphate; bleached.

Manufacture.—Selected soft winter wheat is cleaned, scoured, tempered and milled by essentially the same procedures as described in THE JOURNAL, June 18, 1932, page 2210. Chosen flour streams are blended, bleached with nitrogen trichloride (⅙ ounce per 196 pounds of flour) and with a mixture of benzoyl peroxide and calcium phosphate (1 part to 50,000 parts of flour) and finally mixed with 0.5 per cent monocalcium acid phosphate.

Analysis (submitted by manufacturer).—

	per cent
Moisture	11.0–13.0
Ash	0.6– 0.7
Fat (ether extraction method)	0.8– 1.0
Protein (N × 5.7)	8.0– 9.0
Crude fiber	0.3– 0.5
Carbohydrates other than crude fiber (by difference)	79.3–75.8

Calories.—3.6 per gram; 102 per ounce.

Claims of Manufacturer.—This flour is designed for general home baking, especially biscuits and cakes.

QUAKER YELLOW CORNMEAL

Manufacturer.—The Quaker Oats Company, Chicago.

Description.—Fine granular yellow Indian corn cornmeal containing practically no bran or germ.

Manufacture.—See this section for Quaker White Cornmeal (THE JOURNAL, Jan. 7, 1933, p. 43). Yellow instead of white Indian corn is used for the manufacture of this product. The fine material of desired granulation is packed in cartons under the trade name "Quaker Yellow Cornmeal."

Analysis (submitted by manufacturer).—

	per cent
Moisture	11.8
Ash	0.4
Fat (ether extraction method)	0.7
Protein (N × 6.25)	8.8
Crude fiber	0.8
Carbohydrates other than crude fiber (by difference)	77.5

Calories.—3.5 per gram; 99 per ounce.

Claims of Manufacturer.—A finely granular yellow cornmeal for all table uses.

GLADIOLA PATENT FLOUR

(Matured, Bleached)

FANT'S FAIRY PATENT FLOUR

(Matured, Bleached)

Manufacturer.—Fant Milling Company, Sherman, Texas.

Description.—Patent flour milled from a blend of soft wheat and hard wheat; bleached.

Manufacture.—Selected wheat is cleaned, washed, scoured, tempered and milled by essentially the same procedures as described in THE JOURNAL, June 18, 1932, page 2210. Chosen flour streams are blended and bleached with a mixture of benzoyl peroxide and calcium phosphate (1 part to 50,000 parts of flour) and with nitrogen trichloride (one-sixth ounce per 196 pounds).

Analysis (submitted by manufacturer).—

	per cent
Moisture	13.0 –14.0
Ash	0.36– 0.39
Fat (ether extraction method)	0.8 – 1.2
Protein (N × 5.7)	9.0 –11.0
Crude fiber	0.3 – 0.5
Carbohydrates other than crude fiber (by difference)	76.5 –72.9

Calories.—3.5 per gram; 99 per ounce.

Claims of Manufacturer.—An "all purpose" flour for home baking.

UNION MADE BREAD. LONG LOAF

Manufacturer.—Union Bakery Company, Sioux Falls, S. D.

Description.—A white bread made by the straight dough method (method described in THE JOURNAL, March 12, 1932, p. 889) prepared from patent flour, water, sucrose, shortening, powdered skim milk, salt, yeast and malt syrup.

Analysis (submitted by manufacturer).—

	per cent
Moisture (entire loaf)	37.7
Ash	1.7
Sodium chloride (NaCl)	1.3
Fat	3.3
Protein (N × 6.25)	9.4
Reducing sugars as dextrose	2.7
Sucrose (copper reduction method)	2.5
Crude fiber	0.2
Carbohydrates other than crude fiber (by difference)	47.7

Calories.—2.6 per gram; 74 per ounce.

Claims of Manufacturer.—Conforms to the United States Department of Agriculture definition and standard for white bread.

SUPERB BRAND AMBER SYRUP

(85 Per Cent Corn Syrup, 15 Per Cent Refiners' Syrup)

GOLDEN RULE BRAND AMBER SYRUP

(85 Per Cent Corn Syrup, 15 Per Cent Refiners' Syrup)

Packer.—Penick and Ford Sales Company, Cedar Rapids, Iowa.

Distributor.—Tolerton & Warfield Company, Sioux City, Iowa.

Description.—Table syrup; corn syrup base (85 per cent) with refiners' syrup (15 per cent); the same as Penick Golden Syrup (Corn Syrup and Sugar Refiners' Syrup) (THE JOURNAL, April 2, 1932, p. 1159).

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

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SATURDAY, JANUARY 14, 1933

1933 DUES PAYABLE

Several weeks ago, the bills for 1933 dues were mailed to each Fellow and subscriber of THE JOURNAL. The readiness with which payments have been made is not only gratifying but significant. The number of remittances received actually exceeds those of last year at this time, a fact which indicates the esteem in which physicians hold Fellowship in the Association and the value they attach to THE JOURNAL. For the convenience of those who have not yet paid their 1933 dues, a colored slip is enclosed in this issue. It is a statement, cut in such a form and glued so that when folded a convenient "business reply" envelop is formed, requiring no addressing nor stamps. That THE JOURNAL will be as vitally necessary to the physician during the coming year as during the past is indicated by the fact that already more than a hundred articles of great importance are scheduled for publication. A listing of these articles will be found in the front advertising section, pages 16 and 17. It is earnestly suggested that every physician whose dues are not paid make prompt use of the colored slip and thereby assure uninterrupted delivery of THE JOURNAL to his address.

EXERCISE AND GASTRIC DIGESTION

In Beaumont's classic "Experiments and Observations on the Gastric Juice and the Physiology of Digestion," published in 1833, he anticipated a question that is frequently being asked at the present time; namely, What is the effect of exercise on the gastric secretion of man? Is complete rest after meals desirable in the interest of food digestion? From his observations on Alexis St. Martin, the "man with the lid on his stomach," Beaumont drew the inference—one of the fifty-one inferences with which he concluded his essay—that "gentle exercise facilitates the digestion of food." Since that time the possible significance of another physiologic factor—the emotional state of the person—has come into notice. Today it is realized that anxiety, anger, fear and sorrow may either stimulate or inhibit physiologic processes. The views on this subject in relation to the gastric functions have by no means been uniform. As early as 1846, Combe expressed the dual belief that "rest of body and tranquillity of mind for a short time, both before and after eating, are necessary and conducive to healthy digestion."

The possibility of direct experimentation on man awaited the introduction of the gastric tube, by which test samples of the stomach contents after meals could be removed for comparative analysis; for persons with a gastric fistula such as Beaumont's patient possessed are rarities. The latest investigators [1] in this field, working at the University of Wisconsin, recall that in 1928 Campbell, Mitchell and Powell [2] in England studied a series of normal young men who ate, before exercises, a test meal of bread, meat and potatoes, or a modification of the Boas meal of oatmeal gruel. The severity of the exercise to which these young men were subjected was roughly measured and consisted usually of running round the laboratory, the distance varying from one to four miles. They concluded that such exercise delayed digestion but that lighter exercise, walking, had no inhibitory influence on gastric secretion.

According to the observations of Hellebrandt and Miles,[1] gentle exercise before or after a test meal augments gastric acidity. Protracted exercise is not necessarily depressing; but exhaustive muscular exertion, whether it precedes or follows a test meal, is associated with a diminution of the acidity of the gastric secretion to a level below resting normal, and the decrease is greatest when the exercise is accompanied by emotional excitement. In explanation of some of these manifestations the Wisconsin investigators point out that during muscular exercise, especially when violent and carried on at high speed, lactic acid is rapidly produced, accumulates in the blood, lowers the bicarbonate content and accelerates the output of carbon dioxide. The lungs are unable to wash out the carbonic acid rapidly enough and the hydrogen ion concentration rises. In the light of these experimental observations, they add, the diminution in gastric acidity during violent exercise may be due to the concomitant fall in plasma bicarbonate. In accord with this hypothesis, hypoacidity was observed to appear only when the muscular exertion was associated with evidences of the incurrence of an oxygen debt; and the greatest diminution in gastric acidity occurred when the exercise was severe and exhausting. The physicochemical changes in the blood, they conclude, must therefore be taken into consideration in the determination of the cause of the exercise gastric hypo-acidity. Furthermore, as Hellebrandt

1. Hellebrandt, Frances A., and Miles, Meryl M.: The Effect of Muscular Work and Competition on Gastric Acidity, Am. J. Physiol. **102**: 258 (Oct.) 1932.
2. Campbell, J. M. H.; Mitchell, G. O., and Powell, A. T. W.: Guy's Hosp. Rep. **78**: 279 (July) 1928.

and Miles point out, if the muscular exercise is severe and generalized, splanchnic vasoconstriction diverts blood away from the visceral area to the active skeletal muscles and skin, producing a relative diminution in the oxygen supply to the stomach. This may contribute to the production of the gastric hypo-acidity associated with exhaustive muscular exertion. It may well be, as Hellebrandt and Miles suspect, that moderate muscular exertion heightens the general metabolism, improves the circulation and has a stimulating effect on the organism as a whole, thus augmenting functional activity.

HYPERINSULINISM WITH ADENOMA OF THE PANCREAS

The history of the development of our knowledge of the endocrine glands, though brief, is fascinating. Already their manifold activities have been investigated and measured and in some cases the active substances they secrete have been isolated chemically. Today the physician may supplement a deficient production of endocrine secretions by administration of the appropriate hormone; by surgery he may remove parts of glands that become hyperactive.

Perhaps the most spectacular achievement in this field was the isolation of insulin and its administration in the treatment of diabetes, a disease now frequently called hypo-insulinism. Perhaps just as spectacular is the recent discovery that a disease exists that is the opposite of diabetes. In some patients there is an overproduction of insulin, so that the blood sugar instead of being high as in diabetes is abnormally low; indeed, so low in amount that coma, convulsions and death occur when food is withheld. Moreover, unlike diabetes, in which the lesion is often difficult to demonstrate morphologically, the cases of hyperinsulinism are frequently associated with an adenoma composed of islet cells. In some cases the tumor has been removed with complete cure.

The possibility that a neoplasm of the islets of Langerhans could actually induce symptoms of hypoglycemia by producing an excess of insulin was first demonstrated in the well known case of carcinoma of the pancreatic islets reported in 1927 by Wilder, Allan, Power and Robertson.[1] The characteristic symptoms of weakness, coma and convulsions accompanied by a low blood sugar and relieved by ingestion of carbohydrate were clearly demonstrated. Operation was not performed because the extensive nature of the tumor, composed of islet tissue, as well as the presence of metastases, would have made surgical removal out of the question. Such a combination of symptoms had of course been known since 1922 as being due to the inadvertent giving of an overdose of insulin and was called insulin shock.

Discrete benign tumors of the pancreas composed of islet tissue have been observed by pathologists,[2] but their clinical significance was overlooked until recently. In a series of cases reported by Smith and Seibel [3] is the record of a patient who had had attacks of nervousness and coma, which had been diagnosed as syphilis of the central nervous system. At his final admission to the hospital a routine blood sugar determination was made shortly before death and reported as 58 mg. per hundred cubic centimeters. At necropsy a definite adenoma of the pancreas containing islet cells was found. Recognition that this was an actual case of hyperinsulinism waited five years, when the occurrence of similar cases made the diagnosis clear.

Surgeons were not long in attempting the actual removal of these benign tumors. Howland, Campbell, Maltby and Robinson [4] seem to have reported the first successful cure, although another unreported case in Boston has been mentioned by Cushing.[5] Two additional cases were reported from Barnes Hospital, St. Louis, both operations being successful.[6] One of these patients had had a diagnosis of epilepsy and the other had been labeled a "brain tumor suspect" by competent clinicians. How many similar patients are at large harboring adenomas but removed from a hope of cure by a mistaken diagnosis? Since it is easy to detect these cases by the finding of a low blood sugar, many more will probably be recognized.

The surgical treatment depends on finding the tumor at operation. When the tumor is near the surface and in the body or tail of the pancreas, detection is easy; but the tumors are apt to be so small, as pointed out by Smith and Seibel, that they may be missed even at necropsy if they are embedded in the parenchyma, especially at the head of the gland. The small size of these tumors also raises the question as to how they are able to produce sufficient insulin to cause hypoglycemia when the functional cells in the remaining islet tissue in the rest of the gland far outnumber the cells of the small tumor. Possibly an abnormal secretion is produced in these adenomas. Indeed, Dr. R. R. Bensley, who has "informally" studied nearly all the reported tumors, has shown morphologically that one is dealing with a tumor of abnormal beta cells. His discussion of the microscopic appearance of these tumors is included in the report of the case of Womack, Gnagi and Graham. Another possibility, of course, is that these tumors, though composed of relatively few cells, through their abundant nerve supply are functionally hyperactive and produce insulin in abnormally large

1. Wilder, R. M.; Allan, F. N.; Power, M. H., and Robertson, H. E.: Carcinoma of the Islands of the Pancreas, J. A. M. A. **89:** 348 (July 30) 1927.

2. Warren, Shields: Adenomas of the Islands of Langerhans, Am. J. Path. **2:** 335 (July) 1926.

3. Smith, Margaret G., and Seibel, M. G.: Tumors of the Islands of Langerhans and Hypoglycemia, Am. J. Path. **7:** 723 (Nov.) 1931.

4. Howland, Goldwin; Campbell, W. R.; Maltby, E. J., and Robinson, W. L.: Dysinsulinism, J. A. M. A. **93:** 674 (Aug. 31) 1929.

5. Cushing, Harvey: Neurohypophyseal Mechanisms from a Clinical Standpoint, Lancet **2:** 119 (July 19) 1930.

6. Carr, A. D.; Parker, Robert; Grove, Edward; Fisher, A. O., and Larimore, J. W.: Hyperinsulinism from B-Cell Adenoma of the Pancreas. J. A. M. A. **96:** 1363 (April 25) 1931. Womack, N. A.; Gnagi, W. B., Jr., and Graham, E. A.: Adenoma of the Islands of Langerhans With Hypoglycemia, J. A. M. A. **97:** 831 (Sept. 19) 1931.

amounts. While there are cases of hypoglycemia due to other causes, those due to the presence of a benign adenoma furnish a striking example of triumphant surgical therapy based on extensive fundamental physiologic research.

METHEMOGLOBINEMIA

Diseases once regarded as clinical rarities have come into prominence as more commonly occurring disorders when attention has been explicitly directed to their nature and detection. Sometimes the unexpectedly large comparative prevalence owes its discovery to the introduction of new methods of examination. Heart blocks and arrhythmias are far more familiar to the physician of today than they were to his predecessors of a generation ago, because he has become accustomed to look for their symptoms. It is not long since hyperinsulinism was an unrecognized disease entity. This is true likewise of carotenemia, as distinguished from jaundice. The illustrations could readily be multiplied. Enough have been mentioned to explain the reference here to a rarely recorded type of chronic cyanosis properly designated as methemoglobinemia.

Methemoglobin is not entirely unfamiliar to the biochemist. He can form it in blood through treatment with a variety of chemical compounds: permanganates, chlorates, nitrites, nitrobenzene, acetanilid, and many others. It differs from the conventional oxyhemoglobin in that the oxygen is firmly united in methemoglobin. It also shows a characteristic spectrum that serves for purposes of identification. A prominent feature of methemoglobinemia is cyanosis and, if the condition is severe, dyspnea. The cyanosis is due to the dark brown color of methemoglobin and appears to be more intense than cyanosis produced by a similar concentration of reduced hemoglobin in the blood. The dyspnea is referable to the anoxemia caused by diminution in the oxygen-carrying capacity of the blood.

The term "enterogenous cyanosis" was introduced in 1902 by the Dutch physician Stokvis,[1] who described a case of chronic cyanosis without cardiac or pulmonary lesions or evidences of drug poisoning, which is known to give rise to transient methemoglobinemia.[2] A few additional cases have been recorded from other places. Careful study has revealed the possibility that in some of them the cyanosis may have been due to sulphemoglobinemia, an analogous condition in which the blood pigment is altered by hydrogen sulphide. Only careful examination will permit a distinction between the two sorts of "enterogenous cyanosis." Excluding the doubtful diagnoses, Dieckmann [3] has collected the records of six authenticated cases of true methemoglobinemia, to which he has added a new one. The discovery of the methemoglobin was accidental, but the investigator advises that the possibility of its occurrence in all cases of cyanosis be kept in mind. The diagnosis of methemoglobinemia was based on the following examination: The citrated blood was diluted with nine volumes of water and examined spectroscopically. A band centering at 638 millimicrons was found. Solutions of methemoglobin gave a similar absorption band. The band disappeared on the addition of sodium hydrosulphite. This excludes the possibility that the pigment was sulphemoglobin.

In Dieckmann's patient the cyanosis of unknown origin had been present for twenty-seven years. He believes that the accidental discovery of the methemoglobinemia in a routine examination warrants the statement that the condition would be detected more frequently if the blood of cyanotic patients were examined spectroscopically. More attention should be given to determination of the oxygen capacity of the blood than to the colorimetric determination of hemoglobin. In the normal person, Dieckmann adds, the results are identical, but in certain pathologic conditions the apparent hemoglobin may be within normal limits and yet the patient may be suffering from anemia because a portion of the hemoglobin cannot carry oxygen.

1. Stokvis, B. J.: Nederl. tijdschr. v. Geneesk. **2**: 678, 1902.
2. Jones, C. M.: Cecil's Textbook of Medicine, ed. 2, Philadelphia, W. B. Saunders Company, 1930.
3. Dieckmann, W. J.: Methemoglobinemia, Arch. Int. Med. **50**: 574 (Oct.) 1932.

Current Comment

CONJUGATION OF THE SALICYLATES

Conjugation in the body of drugs and poisons with metabolic products, such as glycine and glycuronic acid, may be regarded biologically as a protective mechanism. The classic example of such detoxication is the conjugation of benzoic acid with glycine, which results in the formation of hippuric acid, an excretory product. A similar detoxicating mechanism was originally postulated for the salicylates, but the evidence in support of this view was inconclusive. Later researches brought forward much evidence of a negative character. Except for an occasional dissenting opinion, it has been generally accepted in this country that the salicyl group is not conjugated with glycine but is excreted unchanged in urine. Thus, there could be no natural salicyluric acid comparable to the chemical analogue hippuric acid. Now comes further desirable confirmation of the negative side from studies of benzoic acid by Quick [1] of the Laboratory of Surgical Research of Cornell University Medical College. Quick determined in dogs the effect on conjugation of benzoic acid with glycine of various chemical substitutions in the benzoic acid. For instance, when the hydroxyl group was in the ortho position, which, of course, gives salicylic acid, Quick found that there was almost a complete inhibition of the conjugation with glycine. The inhibitory effect appeared to be independent of the chemical nature of the group introduced, since the substitution of the bromo, iodo and nitro groups also impeded the union with glycine; not so, however, sub-

1. Quick, A. J.: Proc. Soc. Exper. Biol. & Med. **29**: 509 (Jan.) 1932.

stitutions in the meta and para positions. The introduction of the hydroxy group into benzoic acid also decreased its conjugation with glycuronic acid. Interference with this conjugation occurred after introduction of the chloro and nitro groups into the ortho position, but not after the methyl and amino groups. These results prove the fundamental importance of the position of certain chemical groups for metabolic and pharmacologic actions. Significant is the fact that Quick's results corroborate the negative results of attempts at isolation of salicyluric acid in the urines of animals and human subjects medicated with salicylates. The results of these recent studies leave no doubt that the salicylates for the most part are excreted as such and not changed chemically in their passage through the body. For this reason they probably exert more definite and important pharmacologic actions and therapeutic effects than do the benzoates. The benzoates are rendered practically inert by one of nature's conjugating mechanisms. Quick's work still leaves the salicylates somewhat anomalous biochemically. However, the proof that their fate is definitely different from that of the benzoates now appears unassailable. It follows that similar biologic conjugation mechanisms do not necessarily or generally exist for chemically related substances. A small difference in chemical composition may apparently command a different mechanism for detoxication.

Medical Economics

NEW FORMS OF MEDICAL PRACTICE

11. Hospital Insurance Schemes

PLANS IN THE UNITED STATES

Because it was one of the first and most widely discussed of hospital insurance schemes and therefore more or less of a model for many subsequent ones, the plan of Baylor University Hospital, Dallas, Texas, is first considered. The plan is thus described in the "Basis of Agreement" published by the hospital:

Baylor Group Hospitalization Plan assures hospital service in Baylor University Hospital when needed, operating room service, anesthetics, and laboratory fees, during period of hospitalization not to exceed 21 hospital days during any 12 months' period. In case the assured party should necessarily be hospitalized more than 21 days, then he shall be entitled to a discount of 33⅓% from the regular hospital fees for the time after the first 21 hospital days. Does not include Oxygen tent, X-Ray, special prescriptions, serums, doctor's fees, either physician or surgical, nor the services of a special private nurse, but does include all usual hospital services of under-graduate nurses, nursing supervisors, internes and house staff, and routine medicines, surgical dressings and hypodermics.

Does not apply after resignation or discharge from present employment. Must be collected and paid as a group. Only full time employees of the firm are eligible for the group. Personal identification must be made by some authorized representative of employer.

Does not apply to industrial employment hazards, nor to employer's liability.

This agreement does not apply in case of purposely self-inflicted injury nor obstetrical cases, but in such cases the assured shall be entitled hereunder to a 50% reduction on regular hospital fees, the discount applying only to obstetrical cases after a year of membership under this plan. Except for preliminary hospitalization pending diagnosis, Baylor University Hospital is not prepared to care for and does not accept cases of pulmonary tuberculosis or chronic mental or nervous disorders, or acute venereal infections or virulent contagions, such as smallpox, etc. All such cases need treatment in special hospitals and this group hospitalization plan shall not apply thereon after diagnosis.

In case of epidemic, public disaster or other conditions occasioning an over-crowding of the capacity of Baylor University Hospital to such a degree that it is not possible to provide accommodations and in case adequate accommodations cannot be secured elsewhere in the city, then in the face of such an emergency, the responsibility of Baylor University Hospital under this contract shall be discharged by the refund to the assured of twice the amount that has been paid by the assured under this contract during the twelve months immediately preceding, and such payment shall constitute a full and final discharge of the obligations of Baylor University Hospital hereunder.

All members of the Dallas County Medical Society are eligible to use the facilities of Baylor University Hospital, and no patient can be admitted to Baylor University Hospital except under the care and authorization of some member of the Dallas County Medical Society, patient to leave hospital when discharged by doctor.

A statement prepared by Justin F. Kimball, executive vice president of Baylor University, to answer the numerous inquiries concerning the plan gives the further explanation of its workings:

We have in Baylor at the present about 6,000 members in this plan spread through some 40 groups. We could easily more than double this number; we have declined many groups; but we feel that this is about the number that we can risk on our margin of unoccupied beds. During the past four months the total receipts from these groups has been about $11,850.00; the total amount of the bills paid by these groups has been about $11,000.00.

Baylor Hospital had at the time this description was prepared more than 8,000 members.

. . . . . .

We believe that the following are the essential underlying principles of this group hospitalization plan:

1. The organization must deal with groups, not with individual risks.

2. Groups must be employed, full-time wage earners. (Intermittent employment, such as teaching, nursing, etc., brings much higher actuarial risk.)

3. The total number of members—spread in all groups to make the law of averages safely apply—should be at least three to five thousand. A hospital cannot in fairness take a larger number of members than its marginal number of usually unoccupied beds will warrant. Even it must protect itself against over-commitment in the day of epidemic. A hospital is totally unlike an insurance company in this respect—its capacity has a rigid limitation not subject to quick or easy extension.

4. Group hospitalization should give only *hospital* service, and should not in any case give service that in any way competes with the physician's professional service. You have to depend on your medical staff to protect the hospital from malingering of patients. Also, remember that when you promise any single individual service to *all* members, you lose the actuarial significance of a group.

5. We allow the patients under the group hospitalization full liberty of choice as to the physician treating him in the hospital.

6. A long time commitment to a fixed rate should be avoided. One of the best by-products of such group plan is that coming to the hospital with the bill already provided for educates patients to be hospital minded and will increase hospital patronage and eventually bring a higher group rate.

7. Different types of employed groups present varying actuarial risks as to sickness and differing desires as to the type of accommodations. For instance, bank employees are better actuarial health risks than laundry employees but desire better accommodations, so we make the same rate for both groups but contract for different accommodations for each group.

8. In our own hospital we have definitely adhered at all times to the policy of dealing directly with the groups through the employer or other representative and have never employed any outside selling organization or middleman representative. We feel that this is far the safer course.

9. Our accounting department charges all discounts and other allowances based on group membership to the respective accounts, so that at all times we know the exact and real status of each group as an economic venture.

Similar plans were soon adopted by a number of other hospitals and the movement began to take on a wider scope. There were obvious objections to the individual plan in a locality containing a number of hospitals. It offered no choice of hospitals and rested on a somewhat forced monopoly of a large section of medical practice.

Two additional features soon entered the picture: the organization of a general scheme embracing several hospitals and the introduction of professional, profit-seeking promoters.

These plans are described by Robert Jolly, superintendent of Memorial Hospital, Houston, Texas, who has been an active participant in this evolution (*Hospital Management*, October, 1932, p. 19):

(1) A plan whereby *one* hospital using its own personnel as agents sells to employed groups contracts which assure them hospitalization in the particular hospital only. The money collected from such sales goes into that hospital's treasury.

(2) The same plan as (1) except that the hospital employs an outside agency to sell the contracts.

(3) A plan entered into by *more than one* hospital whereby the purchaser of contract may choose any one of the participating hospitals for admission, such contract to be sold by an agent of the hospital group. The money collected is placed in a reserve fund against which the hospitals charge $5 per day for each patient and $10 if operating room is used.

The third plan, (3) above, with slight differences, is in operation in San Antonio and Houston, Texas. The promoting organization is the Hospital Service Company, which operates

a sales organization, charges $9.75 a year "payable $1.50 in advance the first month of each contract year and 75c thereafter" each month. Six dollars of this annual payment is placed in a fund for payment of hospital bills according to a fixed scale, usually $5 a day, with practically the same restrictions as already described in the Baylor plan. So far as can be determined, the additional $3.75 a year is retained by the promoter to cover sales and other expenses and profits.

A number of organizations are already in the field looking for the profits to be gathered by securing control of a section of the market for hospital services. They are actively utilizing all the forces of skilful salesmanship to urge the adoption of schemes of hospital insurance and to insert themselves into the flow of income from patients to hospitals in order to tap that flow for their own profit.

One of these, which has organized several such plans, is the "M. L. Johnstone, Inc. Co-operative Hospital Service." This plan collects $1 membership fees and 75 cents a month ($9 a year) from industrial groups. The promoters retain the membership fee and $2 out of each $9 paid subsequently.

In a sample proposal, covering 4,500 members, the gross income is computed at $125,000; "of this the hospital will retain $99,000" and will pay the promoters and managers $27,000, which is 21.42 per cent.

In the model plan described by M. L. Johnstone, Inc., it is estimated that the hospital at the end of three years "will have a surplus of $18,000 which may be used towards general expenses, invested for betterments, or held as a cash reserve to guarantee execution of membership contract under peak conditions."

The promoters are to have full charge of the financing and are to "assign to the installation, operation and expansion of the method in your hospital a major staff of five persons as follows: Director, Organizer, who is to have a staff of solicitors, Actuarial Consultant, Certified Public Accountant, and a Resident Manager."

The hospital backers and friends pledge themselves to lend their prestige to assist in securing the approval of executives, the heads of great corporations and all other civic and medical leaders.

There are variations under each of these plans. While most of the promoting schemes depend on group sales to industrial groups, whose "sales resistance" can be broken down by pressure through the employer, the U. S. Travelers Hospitalization Corporation sells individual policies. The following paragraphs descriptive of this scheme are taken from a sales pamphlet issued by the corporation and entitled "Group Hospitalization":

> The annual payment or subscription to be made by Certificate Holders is $12.00 including X-Ray service, or $10.00 not including X-Ray service.
>
> The hospitalization service to be rendered by the Group Hospitals is as follows:
>
> (a) To provide semi-private room, operating room, anesthesia, general nursing care, internes and house staff, dietitian, food, medicines and all usual service during period of hospitalization not to exceed 21 days within the period of one year covered by such certificate.
>
> (b) It shall not include any special doctors' fees, either medical or surgical, nor the service of a private nurse.
>
> . . . . . .
>
> Out of all payments or subscriptions made by Certificate Holders, U. S. Travelers Hospitalization Corporation will deposit in trust in one or more leading banks the sum of $4.50 for each annual, or $2.25 for each semi-annual payment or subscription received. The Group Hospitals shall be entitled to draw against this First Trust Fund the amount of their service charges in accordance with the rates agreed upon.
>
> U. S. Travelers Hospitalization Corporation will also deposit out of such payments or subscriptions made by Certificate Holders an additional sum in a Second Trust Fund in the amount of $2.00 for each annual, or $1.00 for each semi-annual payment.
>
> If the moneys in the First Trust Fund shall be exhausted the Group Hospitals shall be entitled in like manner to draw against the Second Trust Fund. Such drafts shall be made by letter by the Group Hospital to U. S. Travelers Hospitalization Corporation.
>
> . . . . . .
>
> Any balance of the Second Trust Fund at the end of each calendar year, together with the balance of the payments of Certificate Holders, shall be retained by U. S. Travelers Hospitalization Corporation for maintenance of sales organization, publicity, statistical department, compilation of hospital and health data, as well as for the corporate affairs of the Company and as charges for services.

The U. S. Travelers Hospitalization Corporation claims to utilize for the benefit of its certificate holders only those hospitals which are registered by the American Medical Association. The list of hospitals published by the Corporation includes 127 hospitals in thirty-four states and the District of Columbia, although it is stated that there are now about 200 hospitals giving hospital service according to the corporation's plans.

A group hospital plan which has been proposed to the Chicago Hospital Association suggests the formation of the Chicago Hospital Service Association, Inc., "for the purpose of acting solely as the fiscal agent for a group of hospitals which individually and jointly agree to provide hospital care to subscribers to the group hospitalization plan."

The dues are fixed at $10 for each member of an employed group, with a provision that dues may be reduced to not less than $8, "provided the percentage of subscribers and the nature of employment make such a group particularly desirable from the economic point of view." There is a further provision for annual dues of "$12 for individual memberships of employed or non-employed persons, payable semi-annually in advance. Hospital benefits are extended only after a three-months' waiting period, except in the case of accidental injuries. Individual policyholders are not eligible for discounts on service or maternity cases."

This provision for individual memberships is an extension of the plan that may well have special dangers, especially as it is also suggested that "salesmen might be employed on a salary or commission basis to introduce the plan." The extra $2 for individual membership might be used either as an additional security against the risks on such individual memberships or as an additional commission to overcome sales resistance in soliciting such persons. In either case it opens the door to a host of new problems and possible abuses.

There are the customary restrictions to twenty-one days' hospitalization, the exclusion of certain classes of disease, and the provision for a one-third discount on hospitalization after twenty-one days and of 50 per cent on "special and expensive medicines" and obstetric service ten months after date of membership.

The Chicago Hospital Service Association is to collect and hold the dues. "A substantial portion of such dues would be paid at the time when services are rendered to subscribers, the remainder being held for future distribution according to an agreed policy of the participating hospitals."

A Chicago corporation, the Hospitalization Service Co., Inc., is already operating, and claims to have signed contracts with a number of hospitals and physicians.

The president of this company is Edward B. Roberts, secretary and treasurer of the Dahlberg Corporation of America. There are fifteen members on the board of directors, nearly all of whom are officials of commercial organizations and none of whom are physicians.

This company offers a complete hospital and medical service, including house and office calls, an annual physical examination and complete maternity service. The charge is $2 per month and solicitors are employed, who distribute return postal cards from house to house as a means of obtaining leads. While the post cards announce, as quoted above, "complete hospital medical care," and that "no physical examination is necessary," the contract with the hospital makes the usual exemptions of chronic and contagious diseases.

This contract with the hospital provides for the payment to the hospital of 50 cents a month or $5 a year for the hospital service. For the "complete" service these payments are 75 cents a month or $8 a year. Other clauses of the contract read as follows:

> This agreement shall continue for a period of five years from this date, and shall be renewed for like periods at the end thereof unless first party shall advise second party at least thirty days prior to the end of any five year period of its desire to terminate, provided however that first party may terminate this agreement at the end of any ——— ——— if there shall be less than ——— ——— contracting members in "good standing" during the previous ——— ——— by thirty days notice to second party, provided however that in the event of such cancellation service shall be given by first party to contracting members for such periods as such contracting members shall be paid in advance.
>
> During the life of this agreement first party agrees not to enter into any similar agreement with any other persons, firms or organizations, provided however that nothing herein shall prevent first party from agreeing to render group service to any one or more companies or corporations separately for the employees of such company or corporation.

It would appear from these documents that the company collects $24 a year and pays from $6 to $8 of this to the hospitals and physicians who are to give the service. The latter

sum appears to be paid directly to the hospital, apparently under the supposition that its staff members are to make the home calls and give all other services without further remuneration. This conclusion is strengthened by a clause in the contract, of which the hospital is the "first party" mentioned, reading:

(A) First party may designate the hospital or hospitals to which contracting members may be assigned, and also may designate which member of the staff of first party shall render office or home medical service or which member of the staff of first party shall attend the patient in the hospital.

(B) No contracting member may enter such hospital or a hospital patient until examined by a member of the staff of first party.

(To be continued)

THE PHYSICIAN'S INCOME TAX—1933

The taxpayer who is required to make a return must do so on or before March 15, unless an extension of time for filing the return has been granted. For cause shown, the collector of internal revenue for the district in which the taxpayer files his return may grant such an extension, on application filed with him by the taxpayer. This application must contain a full recital of the causes for the delay. Failure to make a return may subject the taxpayer to a penalty of 25 per cent of the amount of the tax due.

The normal rate of tax on individual citizens or residents of the United States, under the Revenue Act of 1932, is 4 per cent on the first $4,000 of net income in excess of the exemptions and credits, and 8 per cent on the remainder.

WHO MUST FILE RETURNS

1. Returns must be filed by every person having a *gross* income of $5,000 or more, regardless of the amount of his net income or his marital status. If the aggregate gross income of husband and wife, living together, was $5,000 or more, they must file a joint return or separate returns, regardless of the amounts of their joint or individual net incomes.

2. If *gross* income was less than $5,000, returns must be filed (*a*) by every unmarried person, and by every person married but not living with husband or wife, whose *net* income was $1,000 or more, and (*b*) by every married person, living with husband or wife, whose *net* income was $2,500 or more. If the aggregate net income of husband and wife, living together, was $2,500 or more, each may make a return or the two may unite in a joint return.

If the status of a taxpayer, so far as it affects the personal exemption or credit for dependents, changes during the year, the personal exemption and credit must be apportioned, under rules and regulations prescribed by the Commissioner of Internal Revenue with the approval of the Secretary of the Treasury, in accordance with the number of months before and after such change. For the purpose of such apportionment a fractional part of a month should be disregarded unless it amounts to more than half a month, in which case it is considered as a month.

As a matter of courtesy only, blanks for returns are sent to taxpayers by the collectors of internal revenue, without request. Failure to receive a blank does not excuse any one from making a return; the taxpayer should obtain one from the local collector of internal revenue.

The following discussion covers matters relating specifically to the physician. Full information concerning questions of general interest may be obtained from the official return blank or from the collectors of internal revenue.

GROSS AND NET INCOMES: WHAT THEY ARE

Gross Income.—A physician's gross income is the total amount of money received by him during the year from professional work, regardless of the time when the services were rendered for which the money was paid, plus such money as he has received as profits from investments and speculation, and as compensation and profits from other sources.

Net Income.—Certain professional expenses and the expenses of carrying on any enterprise in which the physician may be engaged for gain may be subtracted as "deductions" from the gross income, to determine the net income on which the tax is to be paid. An "exemption" is allowed, the amount depending on the taxpayer's marital status during the tax year, as stated before. These matters are fully covered in the instructions on the tax return blanks.

DEDUCTIONS FOR PROFESSIONAL EXPENSES

A physician is entitled to deduct all current expenses necessary in carrying on his practice. The following statement shows what such deductible expenses are and how they are to be computed:

Office Rent.—Office rent is deductible. If a physician rents an office for professional purposes alone, the entire rent may be deducted. If he rents a building or apartment for use as a residence as well as for office purposes, he may deduct a part of the rental fairly proportionate to the amount of space used for professional purposes. If the physician occasionally sees a patient in his dwelling house or apartment, he may not, however, deduct any part of the rent of such house or apartment as professional expense; to entitle him to such a deduction he must have an office there, with regular office hours. If a physician owns the building in which his office is located, he cannot charge himself with "rent" and deduct the amount so charged.

Office Maintenance.—Expenditures for office maintenance, as for heating, lighting, telephone service and the services of attendants, are deductible.

Supplies.—Payments for supplies for professional use are deductible. Supplies may be fairly described as articles consumed in the using; for instance, dressings, clinical thermometers, drugs and chemicals. Professional journals may be classified as supplies, and the subscription price deducted. Amounts currently expended for books, furniture and professional instruments and equipment, "the useful life of which is short," may be deducted; but if such articles have a more or less permanent value, their purchase price is a capital expenditure and is not deductible.

Equipment.—Equipment comprises property of more or less permanent value. It may ultimately be used up, deteriorate or become obsolete, but it is not in the ordinary sense of the word "consumed in the using"; rather, it wears out.

Payments for equipment or nonexpendable property for professional use cannot be deducted. As property of this class may be named automobiles, office furniture, medical, surgical and laboratory equipment of permanent value, and instruments and appliances constituting a part of the physician's professional outfit and to be used over a considerable period of time. Books of more or less permanent value are regarded as equipment, and the purchase price is therefore not deductible.

Although payments for equipment or nonexpendable articles cannot be deducted, yet from year to year there may be charged off against them reasonable amounts as depreciation. The amounts so charged off should be sufficient only to cover the lessened value of such property through obsolescence, ordinary wear and tear, or accidental injury. If improvement to offset obsolescence and wear and tear or injury has been made, and deduction for the cost claimed elsewhere in the return, claim should not be made for depreciation.

A hard and fast rule cannot be laid down as to the amount deductible each year as depreciation. Everything depends on the nature and extent of the property and on the use to which it is put. Five per cent a year has been suggested as a fair amount for depreciation on an ordinary medical library. Depreciation on an automobile would obviously be much greater. The proper allowance for depreciation of any property is that amount which should be set aside for the tax year in accordance with a reasonably consistent plan, not necessarily at a

uniform rate, whereby the aggregate of the amounts so set aside, plus the salvage value, will at the end of the useful life of the property in the business equal the purchase price of the property or, if purchased before March, 1913, its estimated value as of that date or its original cost, whichever may be the greater. The physician must in good faith use his best judgment and make such allowance for depreciation as the facts justify. Physicians who, from year to year, claim deductions for depreciation on nonexpendable property will do well to make annual inventories, as of January 1, each year.

Medical Dues.—Dues paid to societies of a strictly professional character are deductible. Dues paid to social organizations, even though their membership is limited to physicians, are personal expenses and not deductible.

Postgraduate Study.—The Commissioner of Internal Revenue holds that the expense of postgraduate study is not deductible.

Traveling Expenses.—Traveling expenses, including amounts paid for transportation, meals and lodging, necessarily incurred in professional visits to patients and in attending medical meetings for a professional purpose, are deductible.

AUTOMOBILES

Payment for an automobile is a payment for permanent equipment, and is not deductible. The cost of operation and repair, and loss through depreciation, are deductible. The cost of operation and repair includes the cost of gasoline, oil, tires, insurance, repairs, garage rental (when the garage is not owned by the physician), chauffeurs' wages, etc.

Deductible loss through depreciation is the actual diminution in value resulting from obsolescence and use, and from accidental injury against which the physician is not insured. If depreciation is computed on the basis of the average loss during a series of years, the series must extend over the entire estimated life of the car, not merely over the period in which the car is in the possession of the present taxpayer.

If the automobile is used for professional and also for personal purposes—as when used by the physician for recreation, or used by his family—only so much of the expense as arises out of the use for professional purposes may be deducted. A physician doing an exclusive office practice and using his car merely to go to and from his office cannot deduct depreciation or operating expenses; he is regarded as using his car for his personal convenience and not as a means of gaining a livelihood.

What has been said with respect to automobiles applies with equal force to horses and vehicles and the equipment incident to their use.

MISCELLANEOUS

Laboratory Expenses.—The deductibility of the expenses of establishing and maintaining laboratories is determined by the same principles that determine the deductibility of other corresponding professional expenses. Laboratory rental and the expenses of laboratory equipment and supplies and of laboratory assistants are deductible when under corresponding circumstances they would be deductible if they related to a physician's office.

Losses by Fire, etc.—Loss of and damage to a physician's equipment by fire, theft or other cause, not compensated by insurance or otherwise recoverable, may be computed as a business expense, and is deductible, provided evidence of such loss or damage can be produced. Such loss or damage is deductible, however, only to the extent to which it has not been made good by repair and the cost of repair claimed as a deduction.

Insurance Premiums.—Premiums paid for insurance against professional losses are deductible. This includes insurance against damages for alleged malpractice, against liability for injuries by a physician's automobile while in use for professional purposes, and against loss from theft of professional equipment, and damage to or loss of professional equipment by fire or otherwise. Under professional equipment is to be included any automobile belonging to the physician and used for strictly professional purposes.

Expense in Defending Malpractice Suits.—Expenses incurred in the defense of a suit for malpractice are deductible as business expense.

Sale of Spectacles.—Oculists who furnish spectacles, etc., may charge as income money received from such sales and deduct as an expense the cost of the article sold. Entries on the physician's account books should in such cases show charges for services separate and apart from charges for spectacles, etc.

Association News

THE MILWAUKEE SESSION

Milwaukee Hotels

Below may be found a list of Milwaukee hotels and rates for rooms. On advertising page 37 of this issue of THE JOURNAL may be found this list together with an application form that may be used to secure reservations through the Subcommittee on Hotels of the Local Committee on Arrangements.

Hotels at Milwaukee

Name and Address	Single		Double		Suites
	Without Bath	With Bath	Without Bath	With Bath	
ABBOTT CREST, 1226 W. Wisconsin Ave.	$2.00-2.50	$3.00-3.50	$3.00-3.50	$4.00-6.00	$8-10
AMBASSADOR, 2308 W. Wisconsin Ave.	.....	2.75-4.00	.....	5.50-7.00	10
ASTOR, 924 E. Juneau Ave.	.....	3.00-5.00	.....	5.00-8.00	8-15
BELMONT, 751 N. Fourth St.	2.00-2.50	2.50-3.00	3.00-3.50	3.50-5.00	.....
BLATZ, 145 E. Wells St.	1.50-1.75	2.50-3.00	2.50-3.00	3.50-6.00	.....
CARLTON, 1120 N. Milwaukee St.	1.50-2.00	2.50-3.50	2.00-2.50	3.50-6.00	6.00
COLONIAL, 826 N. Cass St.	.....	1.50-2.00	.....	2.00-5.00	3.50-5
GLOBE, 803 E. Wisconsin Ave.	1.50-2.00	2.50-3.00	2.50-3.00	4.00-5.00	.....
JUNEAU, 807-815 E. Wisconsin Ave.	.....	.....	2.50-3.00	3.50-5.00	.....
KNICKERBOCKER, 1028 E. Juneau Ave.	.....	3.00-4.50	.....	5.00-7.00	10-25
LA SALLE, 729 N. Eleventh St.	.....	2.50-3.00	.....	3.50-6.00	5-10
MARTIN, 707 E. Wisconsin Ave.	1.25-2.00	2.25-3.00	3.00-3.50	3.25-5.00	.....
MARYLAND, 625 N. Fourth St.	1.50-1.75	2.50-3.00	3.00-3.50	5.00-7.00	.....
MEDFORD, 605 N. Third St.	2.25-2.75	2.75-3.00	3.25-4.00	3.75-5.50	.....
MILLER, 723 N. Third St.	1.25-2.00	2.50-3.50	3.00-5.00	4.00-5.00	.....
NEW PFISTER, 424 E. Wisconsin Ave.	2.50-3.00	3.50-5.00	4.00-5.00	5.00-8.00	15-30
PLANKINTON, 609 N. Plankinton Ave.	.....	3.00-5.00	.....	5.00-8.00	12-15
PLAZA, 1007 N. Cass St.	.....	2.50-3.50	.....	4.00-5.00	.....
REPUBLICAN, 907 N. Third St.	1.50-2.00	2.50-5.00	2.50-4.00	3.50-6.00	8-12
ROYAL, 435 W. Michigan St.	2.00-2.50	.....	3.00-4.00	4.00-6.50	.....
SCHROEDER, 643 N. Fifth St.	.....	3.50-5.00	.....	5.50-8.00	16-25
SEVEN-SEVENTY MARSHALL, 770 N. Marshall St.	.....	2.50-3.00	.....	3.50-5.00	.....
SHORECREST, 1962 N. Prospect Ave.	.....	3.50-4.00	.....	5.00-7.00	8-20
TOWER, 716 N. Eleventh St.	.....	2.50-3.00	.....	4.00-6.00	.....
WISCONSIN, 714 N. Third St.	2.50-3.50	3.00-4.00	3.50-4.00	5.00-7.00	.....

The form that is printed in the advertising pages may be clipped and, when properly filled in, should be sent at once to Dr. Harry J. Heeb, Chairman of the Subcommittee on Hotels, 740 North Second Street, Milwaukee, Wisconsin.

If those who expect to attend the annual session of the American Medical Association will send in their applications

at the earliest possible time, there should be no difficulty encountered in securing satisfactory accommodations. Applicants for reservations are especially requested to include a second and a third choice in order that good accommodations may be assured if the desired reservation cannot be had at the hotel of preference.

MEDICAL BROADCAST FOR THE WEEK

American Medical Association Health Talks

The American Medical Association broadcasts on Monday and Wednesday from 9:45 to 9:50 a. m. (central standard time) over Station WBBM (770 kilocycles, or 389.4 meters).

The subjects for the week are as follows:

January 16. Fatigue.
January 18. The Physician's Handicaps.

There is also a fifteen minute talk sponsored by the Association on Saturday morning from 9:45 to 10 o'clock over Station WBBM.

The subject for the week is as follows:

January 21. Heat, Massage and Exercise.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION, PUBLIC HEALTH, ETC.)

CALIFORNIA

District Child Health Conferences.—As an outgrowth of the recent California White House Conference on Child Health and Protection in San Francisco, plans are being made for four district executive conferences to be held as follows:

Southern district, Los Angeles, January 14.
Northern district, Sacramento, January 21.
Central district, Fresno, January 28.
North Coast district, Oakland, February 4.

Indigent County Relief Centralized.—All indigent relief in Alameda County, including inpatient and outpatient care, has been placed under the direction of Dr. Benjamin W. Black, medical director, Highland Hospital, Oakland. According to the November issue of *Modern Hospital,* the change was brought about at a recent meeting of the county board of supervisors, which also directed the county institutions commission to supervise relief work. County physicians now attending indigent patients will work under the direction of Dr. Black and the commission, which is also to develop a health department to cover the unincorporated territory in Alameda County.

Lectures on Infections of Eye.—Dr. Charles Weiss, director, clinical and research laboratories, Mount Zion Hospital, San Francisco, will give six lectures, beginning January 19, on bacteriology and immunology of infectious diseases of the eye. The lectures are open, without charge, to the medical profession and others interested. Following is the list of lectures:

January 19, Summary of the Bacteriology of the More Common Infections of the Conjunctiva.
January 26, Recent Researches on the Etiology and Epidemiology of Trachoma.
February 2, Infections of the Cornea, Iris and Lacrimal Apparatus; Sympathetic Ophthalmia.
February 9, Serum Therapy, Vaccine Therapy and Chemotherapy of Infectious Diseases of the Eye.
February 16, Immunologic Principles Underlying Nonspecific Protein Therapy.
February 23, Fungus Infections of the Cornea, Conjunctiva and Lacrimal Duct.

FLORIDA

Personal.—Dr. Henry Hanson, Jacksonville, state health officer, has been named chairman-elect of the National Malaria Committee.

Society News.—At a recent meeting of the Florida Midland Medical Society, Dr. Samuel A. Clark, Lakeland, was elected president. Dr. Alva C. Hamblin, Valrico, among others, spoke on "The Doctor's Part in Public Health."

Books Given to Board of Health.—About 300 medical books were given to the state board of health recently by Dr. Raymond C. Turck, Ortega, from his library. Dr. Turck was state health officer of Florida from 1921 to 1925.

ILLINOIS

Society News.—The St. Clair County Medical Society was addressed in East St. Louis, January 5, by Dr. William H. Olmsted, St. Louis, on "Treatment of Diabetic Arteriosclerosis and Gangrene of Lower Extremities."——Dr. Louis Rudolph, Chicago, spoke on "Management of the Occiput Posterior Position" before the Tri-City Medical Society at La Salle, January 3.——Dr. William S. Middleton, Madison, Wis., addressed the Peoria City Medical Society, January 3, on "Treatment of Lobar Pneumonia."

Chicago

Society Endorses Minority Report.—A resolution was recently adopted by the council of the Chicago Medical Society commending the signers of the minority report of the Committee on the Costs of Medical Care as expressing the opinions of the majority of the medical profession.

Dr. Martland to Give Hektoen Lecture.—Dr. Harrison S. Martland, chief medical examiner for Essex County, New Jersey, will deliver the ninth Ludvig Hektoen Lecture of the Frank Billings Foundation, February 24. His subject will be "Recent Progress in the Medicolegal Field in the United States."

Faculty Presents Program.—At a meeting of the Chicago Medical Society, January 18, members of the faculty of Loyola University School of Medicine will present the following program:

Basic Factors in Edema and Its Management, Dr. Italo F. Volini.
Ambulatory Treatment of Peptic Ulcer, Dr. Sidney A. Portis.
Tuberculous Anal Fistula, Dr. Clement L. Martin.
Early Diagnosis of Carcinoma of the Cervix, Dr. Henry Schmitz.

INDIANA

Oldest Practitioner Honored.—The Wabash County Medical Society honored Dr. James T. Biggerstaff, Wabash, when it recently named him president of the society and made him an honorary life member. Dr. Biggerstaff is said to be the oldest practitioner in the county. Other officers elected are Drs. Lester B. Rhamy, vice president, and Robert M. LaSalle, secretary.

State Board Observes Fiftieth Anniversary.—With its November bulletin, the Indiana State Board of Health commemorated the fiftieth year of its founding. Although the organization meeting of the board was held Nov. 3, 1881, the first regular session convened, Jan. 19, 1882. During this time six secretaries have served the board:

Dr. Thaddeus M. Stevens, 1882-1883; Dr. E. R. Hawn, 1883; Dr. E. S. Elder, 1883-1884; Dr. Charles N. Metcalf, 1884-1896; Dr. John N. Hurty, 1896-1922; Dr. William F. King, 1922—.

The bulletin is devoted to articles describing the growth of the department since its inception.

KANSAS

Society News.—A joint meeting of the Barton, Ford and Reno county medical societies was recently held in Great Bend; Dr. Clifford L. Hooper, Dodge City, spoke on state medicine, and Dr. Hunter W. Duvall, Hutchinson, presented a case report on treatment of chronic osteomyelitis with maggots.——Dr. Paul A. Gempel, Kansas City, Mo., addressed the Clay County Medical Society, Nov. 10, 1932, on "Management of Posterior Presentations."——Dr. Archibald E. Spelman, Halstead, addressed the Sedgwick County Medical Society, Wichita, Dec. 6, 1932, on "Principles of Drainage," and Dr. Ray A. West, "The Doctor and the Nurse"; Dr. Richard L. Sutton, Kansas City, showed pictures made on a trip to the arctic before the society, Dec. 16, 1932.

MARYLAND

Society News.—Dr. Gabriel Tucker, Philadelphia, addressed the Allegany-Garrett County Medical Society, Cumberland, Dec. 16, 1932, on "Broncho-Esophagoscopy in the Diagnosis and Treatment of Disease."——The Baltimore City Medical Society at a joint meeting with the District of Columbia Medical Society, January 11, heard addresses by Drs. Charles W. Wainwright, Jr., on "Bromide Poisoning"; James M. H. Rowland, "Lower Maternal Death Rate," and John M. T. Finney, Jr., "Appendicitis: A Review of 3,913 Cases."——Dr. Horatio N. Dorman, Washington, D. C., will discuss "Personal Experiences with Transurethral Prostatic Resections" before the Baltimore-Washington Urological Society, January 20.——The Osler Historical Society will hear Dr. Christian Deetjen talk on Wilhelm Konrad von Roentgen, discoverer of the x-rays, at its meeting, January 17. Dr. David I. Macht will discuss a collection of Osler's prescriptions and Osler's materia medica.

MASSACHUSETTS

Obstetric Meeting.—The New England Obstetrical and Gynecological Society, at its fourth annual meeting in Boston, Nov. 30, 1932, heard addresses by the following physicians, among others:

William F. Hoyt, Rupture of the Graafian Follicle, the Corpus Luteum and Small Ovarian Cysts as Causes of Acute Abdominal Emergencies.
Jacob Lerman, Effect of Thyroid States on Pregnancy and Menstruation.
Joe Vincent Meigs, Human Ovary After Injections of the Anterior Pituitary Luteinizing Hormone.
Tracy B. Mallory, Ectopic Decidua.
Aubrey O. Hampton, Roentgen-Ray Treatment of Malignant Disease of the Pelvic Organs.
Grantley W. Taylor, Carcinoma of the Breast During Pregnancy and Before the Menopause.
John C. V. Fisher, Methods of Obstetric Analgesia.
James C. Janney, Some Aspect of Kidney Function in Pregnancy.

Clinics and a symposium on sterility were conducted. At the evening dinner meeting Dr. Barton Cooke Hirst, Philadelphia, was the speaker.

Bills Introduced.—H. 121 seeks to require each city or town to provide for the treatment, either in a hospital or as outpatients, of indigent persons suffering from gonorrhea or syphilis. H. 122 seeks to forbid discrimination against the treatment of venereal diseases in the outpatient department of any general hospital supported by taxation in any city or town where special hospitals, other than hospitals connected with penal institutions, are not provided for the treatment of those diseases at public expense; but any such hospital may establish a separate ward for the treatment of venereal diseases. H. 123, to amend the law prohibiting the divulging of hospital, dispensary, laboratory or morbidity reports and records pertaining to gonorrhea or syphilis, proposes that that law shall not prevent a physician from informing the spouse of a patient having gonorrhea or syphilis of the patient's infection when in the opinion of the physician that information is necessary to protect the patient's spouse. H. 298 proposes to authorize the department of public health to erect one laboratory and experimental hospital and one regional hospital of at least 100 beds in each county.

MICHIGAN

Series of Clinics.—The Wayne County Medical Society has announced a series of clinics to which all physicians and health workers of Detroit are invited, the lectures to be given in the Herman Kiefer Hospital on Wednesdays. Preventive medicine in periodic health examinations will be the general theme for all the clinic lectures and demonstrations, newspapers reported.

Society News.—Dr. Edgar E. Martmer, Detroit, gave the sixth talk in a series arranged for the staff of the Children's Center of the Children's Fund of Michigan, Nov. 24, 1932, on "Significant Factors Regarding Infectious Diseases."——The East Side Medical Society, Detroit, heard Dr. Edward Cathcart discuss "Pyelography in General Medical Diagnosis," November 10.——At a meeting of the Blackwell Woman's Medical Society, November 21, Dr. Harry M. Kirschbaum, Detroit, spoke on "Operative Obstetrical Procedure and a Demonstration of Modern Anesthesia in Obstetrics."——The Dearborn Medical Society was granted a charter as a branch of the Wayne County Medical Society, November 18. It is the fourth branch of the county society.——Dr. David Steel, Cleveland, addressed the medical section of the Wayne County Medical Society, December 13, on "Unusual Aortic Aneurysms and Their Roentgen Diagnosis."——Dr. Carl G. Weltman, Detroit, addressed the St. Clair County Medical Society in Port Huron, December 3, on "Stone in the Kidney."

MISSOURI

Society Offers Gratuitous Care.—The Howell-Oregon-Texas Counties Medical Society, West Plains, at a meeting, October 27, unanimously approved a resolution offering gratuitous services of its members to the poor. The society will cooperate with reputable organizations, but its preference will be for individual rather than group examinations.

Museum and Medical Society Hold Joint Meeting.—At a meeting of the Greater St. Louis Museum of Natural History and the St. Louis Medical Society, Dec. 20, 1932, Dr. William W. Graves presented a death mask of John Hunter. Dr. Francis L. Reder, president of the society, gave the speech of acceptance. Dr. Robert E. Schlueter spoke on John Hunter, 1728-1793, the man and his spirit. An address entitled "An Arctic Safari—with Camera and Rifle in the Land of the Midnight Sun" was presented by Dr. Richard L. Sutton, Kansas City.

Dr. Howard Resigns.—Dr. Harvey J. Howard, since 1927 professor of ophthalmology, Washington University School of Medicine, St. Louis, recently resigned in order to enter private practice in his specialty in St. Louis, *Science* reports. Dr. Howard was head of the department of ophthalmology, Peiping Union Medical College, Peiping, from 1918 to 1927. Since the opening in 1928 of the research center for diseases of the eye, ear, nose and throat at the Washington University School of Medicine, he has been in charge there of ophthalmic research.

NEW JERSEY

Society News.—Dr. William Worthington Herrick, New York, among others, addressed the Bergen County Medical Society, Hackensack, Dec. 13, 1932, on toxemias of pregnancy.——Dr. Arthur C. Morgan, Philadelphia, addressed the Camden County Medical Society, Camden, January 3, on the report of the Committee on the Costs of Medical Care.

Practical Lectures.—Continuing the series of Friday afternoon practical lectures begun in the autumn, the Jersey City Medical Center is presenting the following series for January:

Dr. John F. Erdmann, New York, Recognition and Treatment of Postoperative Complications in Abdominal Surgery, January 6.
Dr. Albert F. R. Andresen, Brooklyn, Gastro-Intestinal Manifestations of Food Allergy, January 13.
Dr. Edward L. Keyes, New York, The General Practitioner's Problem in the Management of Prostatic Retention, January 20.
Dr. Lewis D. Stevenson, New York, Demonstration of a Routine Neurological Examination, January 27.

NEW YORK

Hospital News.—Dr. Adrian S. Taylor, Birmingham, Ala., was appointed superintendent and surgeon-in-chief of the Clifton Springs Sanitarium and Clinic, Dec. 15, 1932. Dr. Taylor, a graduate of the University of Virginia Department of Medicine, Charlottesville, served in the U. S. Public Health Service and spent several years in China as professor of surgery at Peiping Union Medical College. Since 1927 he has engaged in practice in Birmingham.

New York City

New Gastro-Enterologic Society.—The Society for the Advancement of Gastro-Enterology was recently formed with a membership of metropolitan gastro-enterologists. Officers are Drs. Gustave Randolph Manning, president; Isidor L. Ritter and Elihu Katz, vice presidents; William C. Jacobson, secretary; Samuel Mufson, treasurer, and Samuel Weiss, editor. An advisory board has been formed of the following physicians: Edward L. Kellogg, Max Einhorn, Jacob Kaufmann, Anthony Bassler, Albert F. R. Andresen, Harlow Brooks, all of New York; Seale Harris, Birmingham, Ala.; William Gerry Morgan, Washington, D. C., and Martin E. Rehfuss, Philadelphia. Although the society is limited to New York at present, its scope may be extended at the discretion of the board. At the monthly meeting, Dec. 28, 1932, Dr. Einhorn sketched the development of the specialty; Dr. Kellogg gave a lantern demonstration of duodenal problems.

Society News.—At the annual meeting of the New York Academy of Medicine, January 5, Dr. John A. Hartwell, retiring president, gave an address on "Problems Facing the Academy" and Dr. Bernard Sachs, incoming president, on "The Academy: Its Relation to the Art and Practice of Medicine in New York." The seventh Friday afternoon lecture was delivered, January 6, by Dr. William P. Graves, Boston, on "Menopause Disorders," and the eighth by Dr. James Alexander Miller, January 13, on "The X-Rays in the Diagnosis and Study of Pulmonary Tuberculosis."——The program of the Medical Society of the County of New York, Dec. 28, 1932, presented the following speakers: Dr. Iago Galdston, "The Economics of Socialized Medicine"; Michael Davis, Ph.D., Chicago, "Medical Service on an Insurance Basis" and Henry F. Vaughan, Dr.P.H., Detroit, "Participation of the Physician in Public Health Work."——The New York Physicians-Yorkville Medical Society was recently formed by the amalgamation of the two organizations represented in the title.——Dr. Edward M. Livingston addressed the Bronx County Medical Society, Dec. 21, 1932, on "Interpretation of Abdominal Pain."——Dr. Alexander Lambert addressed the Medical Society of the County of Queens, January 6, on pneumonia.

OHIO

Personal.—Dr. Mont R. Reid, Christian R. Holmes professor of surgery, University of Cincinnati College of Medicine, Cincinnati, has been appointed director of surgical service at Cincinnati General Hospital.——Dr. Roy E. Bushong, director of the Milwaukee County Mental Hygiene Clinic, Milwaukee, for the past six years, has been appointed superintendent of the Lima State Hospital for the Criminal Insane, succeeding the late Dr. Wilhelm H. Vorbau. Dr. Bushong was formerly con-

nected with state hospitals at Athens and Toledo.——Dr. Brinton J. Allison, Oak Hill, has been appointed health commissioner of Jackson County.

Testimonial to Obstetricians.—Eight members of the Cincinnati Obstetrical Society were guests of honor at a banquet at the Hotel Sinton-St. Nicholas, Dec. 8, 1932, given by the society as a testimonial to their support in maintaining its high standards for thirty or more years. Dr. Charles E. Iliff, president of the society, presided, and Drs. Charles D. Heisel and Charles E. Hauser made addresses entitled, respectively, "The Obstetrical Society—Past and Present" and "The Old Guard." The physicians and the years in which they became associated with the society were: Drs. William H. Wenning, 1883; Rufus B. Hall, 1888; Leroy S. Colter, 1895; Magnus A. Tate, 1896; Edwin W. Mitchell, 1885; William D. Porter, 1892; James Ambrose Johnston, 1895; James W. Rowe, 1903.

PENNSYLVANIA

Illegal Practitioner Fined.—J. J. Zimbo, Shamokin, pleaded guilty recently to a charge of practicing medicine without a license. He was fined $200 and costs of the prosecution after he had promised to cease practice and to leave the state.

Society News.—Mr. William A. Challener, attorney for the Allegheny County Medical Society, addressed the society, among others, December 20, on "The Medical Expert Witness," and Dr. John H. Alexander, "The Pelvic Colon—Its Importance in Lesions of the Left Lower Quadrant."——Dr. Joseph W. Piekarski, Warrior Run, presented a paper on pneumonoconiosis before the Luzerne County Medical Society, Wilkes-Barre, at the November meeting.——The annual meeting of the Pennsylvania Tuberculosis Society will be held in Lancaster, January 19-20. Topics for the sessions are "Surgery in Tuberculosis," "Control of Tuberculosis in Pennsylvania," and "Means of Discovery and Prevention of Tuberculosis in Young People." Among speakers will be Drs. John B. Flick and Louis H. Clerf, Philadelphia; Jay Arthur Myers, Minneapolis, and Theodore B. Appel, Harrisburg.——Dr. Catharine MacFarlane, Philadelphia, addressed the Harrisburg Academy of Medicine, Dec. 20, 1932, on cancer of the uterus. Dr. George R. Moffitt, retiring president, will give an address, January 20, on cancer research.——Dr. Paul R. Sieber, among others, addressed the Pittsburgh Academy of Medicine, Dec. 13, 1932, on "Post-Traumatic Headache and Its Treatment by Lumbar Insufflation."——Dr. Arthur C. Morgan, Philadelphia, addressed the Elk County Medical Society, St. Marys, Nov. 28, 1932, on "Public Health Consciousness."

Philadelphia

Discussion of Medical Economics.—The regular meeting of the Philadelphia County Medical Society, January 11, was devoted to discussions of medical economics. The speakers were as follows:

Dr. Charles Falkowsky, Jr., Scranton, The State Society's Participation in the Movement for Recovering the Physician's Vanishing Income.
Dr. Harry B. Wilmer, Relation of the Hospital Management to Medical Economics.
Dr. Lyn Waller Deichler, Relation of the Outpatient Department to Medical Economics.
Dr. Francis Ashley Faught, The Questionnaire of the Philadelphia County Medical Society—Summary.
Dr. Seth A. Brumm, Our Opportunity—Shall Medicine Survive or Be Submerged?

Society News.—Dr. Eldridge L. Eliason delivered the annual oration of the Philadelphia Academy of Surgery, January 2, on "The Surgery of Diabetic Gangrene." Drs. George M. Dorrance and Brady A. Hughes presented a review of thirty cases of carcinoma of the breast.——Dr. George E. Pfahler addressed the Philadelphia Roentgen Ray Society, January 5, on "Roentgen-Ray Diagnosis of Mediastinal Tumors and Their Differentiation."——At the meeting of the Obstetrical Society of Philadelphia, January 5, the program included addresses by Drs. Abraham J. Ziserman on "The Incidence and Significance of False Reactions with the Aschheim-Zondek and Oestrin Pregnancy Tests," and Charles Mazer and Louis Edeiken, "The Value of the Aschheim-Zondek Reaction in the Diagnosis and Prognosis of Chorionepithelioma."——Dr. Hans Zinsser, Boston, addressed the College of Physicians of Philadelphia, January 4, on the Rickettsia group of diseases.——Dr. Harvey E. Schock was elected president of the Association of Ex-Residents and Residents of the Philadelphia General Hospital at the annual dinner, Dec. 6, 1932. The two hundredth anniversary of the hospital, formerly called "Old Blockley," was celebrated at the meeting.——Speakers before the Philadelphia Urological Society, Dec. 19, 1932, were Dr. Thomas C. Stellwagen, Jr., on "Heminephrectomy: Indications and Contraindications" and Max Trumper, Ph.D., "Urinary Biochemistry."

WASHINGTON

Course on Heart Disease.—The Seattle Academy of Internal Medicine presented a course of didactic and practical instruction on the normal and pathologic conditions of the cardiovascular system, given by Dr. Hugo Roesler, associate professor of radiology, Temple University School of Medicine, Philadelphia, Dec. 27-31, 1932. Dr. Roesler addressed the King County Medical Society, Dec. 28, 1932, on "Methods of Cardiovascular Study by the Roentgen Ray."

GENERAL

Cleanliness Institute Discontinued.—Cleanliness Institute, New York, established in 1927 by American soap manufacturers, has been discontinued. After March 1 the National Tuberculosis Association, 450 Seventh Avenue, New York, will distribute the educational material created by the institute.

Prize for Essay on Goiter.—The American Association for the Study of Goiter again offers $300 as a first award and two honorable mentions for the three best essays based on original research work on any phase of goiter, to be presented at its annual meeting in Memphis, Tenn., May 15-17. The first award, presented at the meeting in Hamilton, Ontario, Canada, was given to Dr. Donald McEachern, Baltimore, for his essay on "A Consideration of the Mechanism of Hyperthyroidism Based on Its Effect on Cardiac and Skeletal Muscle." Competing manuscripts for the 1933 award must be in English and submitted to the corresponding secretary of the association, Dr. Julius R. Yung, 670 Cherry Street, Terre Haute, Ind., not later than April 1. Manuscripts arriving after this date will be held for the next year or returned at the author's request.

Society News.—The American Society for the Study of Arthritis met in Boston, Dec. 2, 1932, with a program including the following speakers: Drs. Francis M. Rackemann, Boston, on "The Rôle of Allergy in Arthritis"; William W. Lermann, Pittsburgh, "The Gastro-Intestinal Tract in Relation to Arthritis"; Reginald Burbank, New York, "Arthritis from the Standpoint of the Patient," and Lazaros G. Hadjopoulos, New York, "A Study of Streptococci."——Dr. Walter B. Martin, Norfolk, Va., was elected president of the Seaboard Medical Association at its recent annual meeting in Rocky Mount, N. C. Drs. William B. Kinlaw, Rocky Mount; Oscar R. Yates, Suffolk, Va., and John C. Tayloe, Washington, N. C., were elected vice presidents, and Dr. Clarence P. Jones, Newport News, Va., reelected secretary. The next meeting will be in Norfolk.——Dr. James Ramsay Hunt, New York, was elected president of the Association for Research in Nervous and Mental Disease at the close of the annual meeting in New York, Dec. 29, 1932; Drs. Charles Macfie Campbell, Boston, and Earl D. Bond, Philadelphia, vice presidents, and Thomas K. Davis, New York, secretary, reelected.——William Mansfield Clark, Ph.D., Baltimore, was elected president of the American Society of Bacteriologists at the annual meeting in Ann Arbor, Mich., Dec. 30, 1932; Dr. Milton J. Rosenau, Boston, vice president, and James M. Sherman, Ph.D., Ithaca, N. Y., secretary, reelected.

Foundations Decrease Philanthropic Expenditures.—A survey of philanthropic foundations recently completed by the Twentieth Century Fund revealed that in 1931 the field of medicine and public health received the largest share of donations, a total of $17,144,000, or 31.4 per cent of the grand total of all recorded disbursements. According to the New York *Times*, 102 American foundations in 1931 disbursed $54,600,000 for philanthropic purposes. Ninety-one foundations reported the previous year, but, it was stated, "foundation grants appear to have declined 23.7 per cent in 1931, compared with 1930; this decline is about in proportion to estimates of the reduction in the national income as a whole during the same period, which is put at 20 per cent." Education holds second place in appropriations with total grants amounting to $13,579,000, or 24.9 per cent. These two fields of interest alone have received $30,723,000, or 56.3 per cent of the total. Child welfare was given only 2.3 per cent of the total and social welfare reached only 6.4 per cent of the total for all fields put together. The survey pointed out, it was said, that the 1931 total given for social welfare, however inadequate, had increased 40 per cent over the previous year, while grants in other fields had generally declined. The Rockefeller group of philanthropic organizations leads the list of donors, the grants aggregating $29,634,000, or 54.3 per cent of the total given away in this country. Second place was held by the Carnegie group of organizations with grants of $8,991,000, or 16.5 per cent of the total. The General Education Board, although it remained the largest spender in 1931, cut its grants to $15,876,000 from $29,787,000 the previous year. In addition to the Rockefeller

and Carnegie disbursements, which together accounted for 70.8 per cent of the annual national philanthropy, other large foundations include:

Duke Endowment, $3,754,000.
Julius Rosenwald Fund, $2,367,000.
Wyomissing Foundation, $1,130,000.
Children's Fund of Michigan, $871,000.
Commonwealth Fund, $847,000.
Milbank Memorial Fund, $823,000.
Murry and Leonie Guggenheim Foundation, $401,000.
Russell Sage Foundation, $387,000.

In general, it was stated, the survey found foundations "less ready by 30 per cent to finance educational agencies in 1931 than in 1930, while research grants declined 13.8 per cent, and agencies of social action received 3.5 per cent less than the previous year."

Government Services

Report of Surgeon General of Navy

Motor vehicle accidents caused more damage to the personnel of the U. S. Navy during the calendar year 1931 than any other group of hazards, being responsible for 81 deaths and 1,256 hospital admissions, the annual report of Surg. Gen. Charles E. Riggs shows. The number of deaths from this cause was more than twice the number from drowning, which was until 1930 the leading cause of death in the navy. Most of these accidents, which were principally responsible for an increase over the preceding year from 389 to 391 deaths, occurred while the victims were on leave. Of the total number of deaths, 216 were caused by injuries, 172 by disease and 3 by poisoning. There were 40 deaths from drowning, of which 26 occurred as a result of naval and military hazards and 11 from industrial and miscellaneous hazards; 3 were suicides. The death rate from aeronautic activities has progessively declined during the past ten years, the fatality rate per 10,000 flying hours in 1931 being 0.7, compared with 9.8 in 1921; 23 deaths occurred from flight hazards in 1931. Four war casualties were reported as a result of military operations in Nicaragua. There were no major disasters during the year, although 5 deaths were caused by the explosion of an anti-aircraft gun and 2 occurred in the Nicaraguan earthquake. There were 29 suicides and 6 homicides. Among diseases the leading causes of death were diseases of the circulatory system, with 26 deaths; pneumonia, 22; tuberculosis, 17; influenza, 10; abscess, 10, and appendicitis, 10. The hospital admission rate for 1931 was 565 per thousand for all causes, an increase from 520 in 1930, principally due to a higher prevalence of influenza and other respiratory diseases. The average number of sick days per admission was 18.8, the lowest since 1925. There were 18,273 admissions with respiratory disease, not including tuberculosis; 2,384 were patients with influenza. Epidemics of influenza developed in several ports and on shipboard, the largest numbers of cases having been reported from Quantico, Va., with 319, and the U. S. S. *Lexington*, with 217. Only six cases of diphtheria occurred in 1931, in contrast to 76 cases with four deaths in 1930. Eighty cases of scarlet fever with one death were recorded for the year, 24 of the cases at the Naval Academy, Annapolis. Venereal disease was second in number of admissions, with 15,425. Wounds and injuries were third with 7,188. During the year 57,431 persons were treated in naval hospitals, with a total of 2,221,514 treatment days; more than half of those treated were patients of the Veterans' Administration. Fourteen new medical officers were commissioned during the year and 36 were separated from the service, leaving 904 in the medical corps as of June 30, 1932. In the division of aviation medicine were 47 qualified flight surgeons, 27 under flight orders. Research in this division was directed to studies of carbon monoxide with relation to aircraft and of artificial supplies of oxygen for high altitude flying. Studies of personality problems have been continued and the division now has more than 1,300 case reports from which information valuable in the selection of pilots has been extracted. During the last year hospitals at Newport, R. I., Puget Sound, Wash., and Chelsea, Mass., were enlarged and architects are now drawing plans for a new $1,000,000 hospital in Philadelphia. Under the direction of the Naval Medical School, Washington, D. C., research has been conducted on the medical aspects of the submarine "lung," submarine air purification, deep-sea diving and the physiologic action of mustard gas. The total amount appropriated for the Bureau of Medicine and Surgery for the fiscal year 1932 was $3,242,560, of which only $2,167,730.83 was expended, a saving of 33.15 per cent. The average per diem cost of hospitalization was reduced from $4.55 for 1931 to $3.90 for the fiscal year 1932.

Annual Report of Veterans' Administrator

The report of the first year of the consolidation of all veterans' activities under a single jurisdiction indicates that economies in operation and better service to beneficiaries resulted from the change. Because of legislation permitting benefits to veterans regardless of the origin of their disabilities and because of the economic stringency, the number of beneficiaries has increased 20 per cent during the past fiscal year. The total number of veterans receiving benefits, June 30, 1932, was 1,278,046, an increase of 198,059 over the preceding year. The average per diem rate for veterans' hospitals during the fiscal year was $3.44, a decrease of 28 cents from that of the previous year. Administrative costs decreased from 3.88 per cent to 3.78 per cent of the total disbursement. Economies were effected by consolidation of veterans' homes, hospitals and regional offices. The total hospital load, June 30, was 43,841, an increase of 8,702, or about 25 per cent over 1931; the increase includes, however, about 4,174 patients in veterans' homes who have not previously been included as part of the load of the veterans' administration. Of 39,393 patients hospitalized under the veterans' act of 1924, 15,460 were World War veterans receiving care for service-connected disabilities, while 21,655 were under treatment for non-service-connected disabilities; the remaining number were veterans of other wars. Thus, 59 per cent of the hospital load is made up of patients with non-service-connected disabilities, as compared with 14 per cent in 1925, the first year after passage of the act authorizing treatment for that class of disabilities. This year 15 per cent of the patients had tuberculosis; 46 per cent were suffering from neuropsychiatric diseases, and 39 per cent from general medical and surgical conditions. There were during the fiscal year 148,662 admissions to hospitals, an increase of 36 per cent over 1931. The statistics include for the first time patients in veterans' homes. Of the total admissions, 12,868 were for tuberculosis, 7,350 for psychotic diseases, 14,206 for other neuropsychiatric disorders and 114,238 for general medical and surgical conditions. About 86,000 surgical operations were performed. A total of 2,057,712 physical examinations were made in regional offices during the year, an increase of more than 100,000 over the previous year; 4,175 patients were admitted to the four diagnostic centers. During the year, 142,216 patients were discharged after an average stay of seventy-seven days in the hospital. Discharges of patients after treatment for pulmonary tuberculosis numbered 12,905; those for neuropsychiatric diseases, 19,799; those for general conditions, 109,512. The principal psychosis treated was dementia praecox and the greatest number of recoveries took place in the alcoholic psychoses. About 21 per cent of the general patients were treated for diseases of the digestive system. The next largest group received treatment for diseases of the ear, nose and throat. Deaths of veterans in hospitals amounted to 6,972, of which 1,787 were caused by tuberculosis. Cancer and other malignant tumors ranked second, with 665 deaths, about 10 per cent of the total number. There were 113 deaths from suicide, homicide and accident. At the end of the year there were in operation fifty-six veterans' hospitals with a capacity of 29,833, two new hospitals having been opened during the year at Indianapolis and at Waco, Texas. This figure does not include 6,739 beds in veterans' homes. Ten new hospitals and fourteen additions are now under construction (THE JOURNAL, Dec. 17, 1932, p. 2123). In addition to its own hospitals the administration made use of 8,825 beds in other government hospitals and a number in civilian institutions. It is estimated that the construction now authorized will provide facilities sufficient for the hospital load through the year 1937, about 46,500 beds. Estimates beyond that year indicate that facilities must be materially increased if veterans are given mandatory right to hospitalization without regard to the origin of their disabilities, the administrator points out. Net operating expenses for all hospitals for the past fiscal year, which does not include expenditures for new construction or expenses for the diagnostic centers, amounted to $31,995,632.01. Disability compensation from the administration during the year amounted to $189,540,380.76, paid to 328,658 veterans, 29,000 more than in 1931. Neuropsychiatric diseases were the major disability in 21 per cent of the cases and tuberculosis in 19 per cent. At the end of the year, death compensation was being paid to dependents of 97,448 veterans in the sum of $36,715,575.33. Disability allowances to veterans with 25 per cent or more permanent non-service disabilities amounted to $75,458,233, awards having been made to 407,584 veterans for the year, the second in which this form of benefit has been paid. Net disbursements for all activities of the administration during the year aggregated $869,099,937.38. On June 30 there were 36,818 employees on the rolls of the administration, whose salaries amounted to $61,291,367.

Foreign Letters

LONDON

(From Our Regular Correspondent)

Dec. 17, 1932.

The Reform of Medical Education

The defects of medical education, as is well known, particularly the overloaded curriculum, have given rise to much discussion. At the invitation of the University of London, the Universities of Oxford and Cambridge and the Royal Colleges of Physicians and Surgeons have appointed representatives to consider, with those of the University of London, the present defects of the medical curriculum and to make suggestions for reform. The University of London was led to take action by a recommendation of the board of the faculty of medicine, which has been giving consideration to various criticisms of the medical curriculum. The board was also aware that the present position of medical studies was viewed with concern by other bodies and that action by the University of London would be welcomed. Representatives of the conference are leading teachers. They include Sir Farquahar Buzzard, regius professor of medicine, University of Oxford; Dr. W. Langdon Brown, regius professor of medicine, University of Cambridge; Dr. A. M. H. Gray, dean of the Faculty of Medicine, University of London; Lord Dawson of Penn, president of the Royal College of Physicians; Sir Holburt Waring, president of the Royal College of Surgeons. At the first meeting, Lord Dawson was elected chairman. The conference intends to call evidence and to review the whole course of medical education.

Canada's Radium Supplies

It is announced from Vancouver that the Great Bear radium field has ended its first year of active development and that the prospects seem to bear out the estimates of the mining assayers that radium deposists have been discovered which will rival, if they do not exceed, in value those of the Belgian Congo, now the world's main source of supply. The radium field on the shore of Canada's largest expanse of fresh water has over 800 miles of impassable swamp and muskeg country between it and the northern terminal of the railway at Waterways, Alta. Radium ores are now assaying $6,250 to the ton. A high-valued silver deposit is mingled with the pitchblende that contains the radium. There are other metals—copper in vast quantity, gold assaying $25 to the ton, cobalt, bismuth, manganese and coal—but none of these can be mined at present freight rates.

The Prevention of Tuberculosis of Bovine Origin

Sir Hilton Young, minister of health, received a deputation from the People's League of Health asking the government to take steps to increase the safety of milk. Lord Moynihan said that impure milk was responsible for the spread of many diseases, particularly tuberculosis. The ideal method of prevention would be insuring the purity of raw milk, but, failing this, pasteurization should be adopted. He did not believe in the objections urged against it, for any diminution in the nutritive value due to pasteurization could easily be remedied by the supply of other articles of diet. Dr. W. G. Savage, health officer for Somersetshire and a leading authority on milk supply, said that at present no urban area had power to protect its milk supply. The deputation desired to urge on the government three lines of action: (1) steps to reduce bovine tuberculosis, (2) encouragement of tuberculin-tested herds, and (3) pasteurization of milk. The deputation was not asking for universal pasteurization at present, however, but only that municipalities should be enabled to apply to the minister of health for power to require that all milk sold in their districts should be derived from tuberculin-tested herds or pasteurized. The minister of health expressed full sympathy with the desire of the deputation. He had been much interested in the expert views expressed on pasteurization, and he proposed to ask the Cattle Diseases Committee of the Economic Advisory Council to consider the subject and advise on it.

Delay in Operating for Cancer: Lord Moynihan's Views

Speaking at a hospital meeting in Manchester, Lord Moynihan said that cancer was the only one of the six great killing diseases in this country that showed any increase in the last twenty years. While the average death rate from all causes had gone down 32 per cent the cancer death rate had increased 20 per cent, and in the last seventy years more than fivefold. One death in every seven of persons over 35 years of age was due to cancer, yet cancer in its early stages was completely curable. The Ministry of Health statistics showed that 71.4 per cent of persons who had been treated for grade 1 cancer of the breast were alive and well without any evidence of disease ten years after operation, and if deaths from other causes among these cases were excluded, the survivors ten years after operation were 87.5 per cent. Why were equally good results not always obtainable, and on whom should the blame be laid? The medical profession must take a share of it. Too many physicians were still skeptical about the good results from surgical treatment, and in too many cases delayed advising operation and allowed the patient to drift into the condition which made recurrence after operation inevitable. "Wait and see" was wrong; the advice should be "Go and look," and at once. The public was also to blame for the great increase in the severity of cancer because of incredulity as to the results of operations. Patients who had been cured refused to advertise their cures, because of a false notion that cancer was a sort of moral blemish. The public ought to know that in operating the surgeon had gone as far as it was physically possible for him to go. His operations could not be more extensive; it was hardly possible for them to be safer or to have more successful end-results. The reason why equal success did not attend every case was that nearly everything depended on early treatment. Cancer was always primarily a local disease. If it was accessible when local, it was definitely curable. Certain cases were still inaccessible, but even cancer that could not be removed from the brain was now accessible to radium treatment.

Cancer rarely attacked a healthy organ. Such things as chronic irritation, inflammations, lumps and sores on the tongue and lip were not cancerous to begin with but they led to cancer. Cancer was not hereditary, infectious or contagious. Its worst feature was that at first it was almost always painless. He wished it were painful so that people would be driven to the physician. The accessible cancer was curable on one day but not on the next. Hence the overwhelming importance of early diagnosis.

Death of Carey F. Coombs

Dr. Carey F. Coombs, associate editor of the *Medical Annual*, and physician to the Bristol Royal Infirmary with charge of the university center for cardiac research, has died at the age of 53 from coronary thrombosis. It is an example of the irony of fate that this eminent cardiologist should have had his career cut short by the disease on which he had done so much work. An enthusiastic investigator and teacher, he was well known for his writings on heart disease. At the time of his sudden illness he was in the middle of a series of lectures on cardiovascular disease from a clinical standpoint, which he was contributing to the *Clinical Journal* and intended to publish subsequently in book form. Three days before his death, when he seemed to be recovering from the heart attack which proved fatal, he joined in a symposium in the *British Medical Journal* on varicella in old age, bringing forward a case at the age of 93. Educated at St. Mary's Hospital, London, he graduated with honors in London University in

1901. He settled in Bristol, where he held in sucession the posts of registrar of the Children's Hospital, curator of the museum at the General Hospital University, demonstrator of pathology, and assistant and full physician to the General Hospital. He was best known for his writings on the various forms of carditis, which were the result of prolonged and careful observation, both pathologic and clinical, and shed new light on the subject.

PARIS

(From Our Regular Correspondent)

Nov. 30, 1932.

Physicians Who Inoculated Their Children with the B C G Vaccine

In France, at present, one child out of five is inoculated during the first week of life with B C G vaccine, and no untoward results have as yet been reported. The average number of vaccinations given each month is 10,700. Outside of France, more than a half million children have been vaccinated. As Mr. Calmette has previously announced, the immunity conferred by the B C G vaccine against tuberculosis has proved valuable, in addition, for other infectious diseases to which the child is exposed: pertussis, measles, bronchopneumonia and enteritis. The general mortality, which includes all traumatisms as well as diseases, is only 4.6 per cent, as against 25 per cent in the nonvaccinated, during the first year. Of 579 children who have been vaccinated during the period of more than four years and who have remained in a contagious familial environment, not one has died. To obtain more precise statistics, Mr. Calmette instituted an inquiry by sending out a detailed questionnaire to 280 physicians residing in eighty different departments of France, who had requested the B C G vaccine to vaccinate their own children. In this way, one could be certain that the vaccinated children had been followed up with special attention each day. The total number vaccinated was 514 and their ages today range between 1 and 9. Of these 514 children, 60 have lived in a known contaminated environment, 43 in a suspected environment; 140 have received two revaccinations, generally at age 1 and again at age 3. From 1924 to 1932, there were seven deaths in this group of 514 children, but only one from a tuberculous disease (tuberculous meningitis at age 3). The child had not been revaccinated, and he was in contact with a maidservant who was later recognized as tuberculous. The 507 survivors were, in 1932, in excellent health with the exception of four, who are at present puny and weakly, without assignable cause. These 280 physicians vaccinated, in addition to their own children, 7,017 other children of their clientele. Twenty-one physicians of this group vaccinate systematically all the children they bring into the world. In citing these statistics, Mr. Calmette repeated that no experiment, if properly conducted, has furnished evidence that his B C G bacillus ever regains its virulence. In 400 necropsies on vaccinated children, as performed in various countries of the world, no tuberculous lesions have ever been discovered. The B C G bacillus has often been found in a living state in the glands, but no serial inoculations into animals sufficed to restore its virulence. The maintenance of allergy in the vaccinated children has been controlled by many physicians up to the age of 5. It is therefore perfectly safe to revaccinate at ages 1, 3, 5 and 7 such children as are especially menaced; that is to say, those who are the offspring of tuberculous parents or who are living in unfavorable surroundings. Nevertheless, Mr. Calmette does not think that compulsory vaccination with the B C G bacillus should be introduced as yet. Many children die of dystrophies having an unknown cause. Although the use of the B C G vaccine does not enter into the case, it is to be feared that public opinion would without justification hold it responsible for these deaths and that a prejudice would develop against the B C G bacillus, as has happened in England and America with respect to smallpox vaccination, which has served to perpetuate smallpox in those two countries, from which it should have been eradicated long ago.

A New Type of Artificial Irradiation

The use of "artificial beaches" for the irradiation of young children, and especially rachitic children, by ultraviolet rays is becoming widespread. This treatment requires of course general medical supervision, and the children have heretofore been obliged to wear spectacles with special lenses to counteract the harmful effects of the ultraviolet rays on the eyes. However, Blancani and J. Walter have recently exhibited to the Société d'électro-radiologie a new apparatus that permits the exposure of children to arc lamps without any harmful effects on the eyes and hence dispenses with the wearing of special spectacles by the children and by the hospital personnel. The lamps are directed toward the ceiling, whence the rays are reflected by metal reflectors formed of plates of stainless steel, each consisting of a large number of small hemispherical surfaces by which the dispersion of the reflected rays in all directions is brought about. Shades attached to the reflectors prevent direct irradiation downward below a horizontal line. On looking at the ceiling, one sees only countless brilliant points spread over several square meters of surface, so that, in spite of the intensity of the light, there are no dazzling effects. An accommodation or adaptation anteroom is first entered before passing into the so-called artificial beach, and another room follows that has no direct illumination but a zone of shadow that contains, however, by diffusion an appreciable proportion of ultraviolet rays. On the other hand, with carbon lamps of the new type, the authors secure a bluish light that furnishes a solar illumination of 5,000 units, which corresponds to that of the sun in the spring and the fall. Children are allowed to remain in the "artificial beach" for prolonged periods without direct medical supervision, and are allowed the privilege of playing games just as if in the open air.

Fee Stubs for the Income Tax Collector

Like many other countries at present, France is struggling with a deficit in its annual budget, which compels the government to retrench and also seek means for increased revenue. Instead of attacking the evident causes of the deficit, which are the many forms of demagogic legislation passed in the last four years (the social insurance system, the pensioning of ex-service men, increases in the salaries of civil service workers, and pensions of all sorts), the government is seeking to increase its revenues by the imposition of new taxes. The minister of finance has announced that he plans to institute a thorough inquiry into the incomes of the liberal professions, which, according to him, inaccurately declare their income. The fact is that the liberal professions are not in as good a position to defend their rights as are the workingmen, the peasants and the civil service employees, all of whom are members of some loud-spoken and menacing syndicate. The liberal professions, with rare exceptions, are in a difficult situation. The minister of finance appears to have physicians particularly in mind, for, he states, the national treasury does not have adequate control over the sums that physicians receive from patients. He suggests, therefore, that no medical prescription be acceptable unless written on blanks with corresponding stubs on which the charge for each call should be stated, and the stubs should be presented each year to the income tax collector. The minister contemplates applying similar measures to the lawyers. The Confédération des syndicats médicaux immediately presented a sharp protest against such a suggestion, pointing out that such blanks and stubs would constitute a violation of the right of privileged communication. Furthermore, it is well known that physicians make many calls for which they receive absolutely no fee. Verification of the fees recorded in the stubs, by inquiring of the patients themselves, would be an insurmounta-

ble difficulty. The declaration of a strike by the medical profession, directed against the social insurance system, has been proposed as a means of defense in the event that the contemplated legislation is enacted.

BUENOS AIRES

(From Our Regular Correspondent)

Nov. 1, 1932.

Two Full Time Professors Resign

The board of directors of the School of Medicine of Rosario recently resigned because the directors have had some difficulties with the students. The new board of directors has expressed a wish to nullify many of the regulations made by the previous boards for the management of the school. The School of Medicine of Rosario is dependent on the University of Litoral. The university controls seven medical schools and also other scientific centers. One of those centers, the Escuela de Agronomia y Veterinaria of the province of Corrientes, has more teachers than students. As a result of the economic conditions, the government recently reduced the yearly allowance of the University of Litoral, which in turn reduced the allowances given to the medical schools and scientific centers under its control. The medical school of Rosario could have met this deficit by reducing some of its expenses. There are, for instance, three courses on the same subject (psychiatry); many other subjects which are not strictly of a university nature could have been discontinued. However, in order to economize, the salaries of the professors were reduced. Drs. Ruíz and Hug, directors of the institutes of anatomy and of pharmacology of the medical school of Rosario, whose contracts expired, refused to sign a new contract at a reduced salary. Then the board of directors decided to eliminate the course of pharmacology. However, the students and some professors opposed dropping the course and finally they decided to continue it. The vacancies left by Drs. Ruíz and Hug were reported so that applications for the positions could be made. The monthly salary to be given professors in those positions is 500 pesos ($130) as directors of the institution and 300 pesos ($78) as professors, making a total of 800 pesos ($280) a month. However, this amount is more theoretical than real, because, owing to taxes, the salary is reduced to 700 pesos ($182). The full time professors of the medical school of Rosario had 1,300 and 1,500 pesos ($338 and $390), respectively, for their monthly salaries. By giving them only 700 pesos the school saves 1,500 pesos a month, although the full time system is sacrificed. Those full time professors have devoted the past ten or fifteen years to laboratory research and now they are compelled to practice medicine or do other things for a living, while their places are taken by others who have not had so much experience. There were five full time professors in the medical schools of Argentina. By the elimination of these two there are now only three (Drs. Houssay, Lewis and Elizalde).

New Regulations for the Practice of Medicine

The national department of public health has presented a proposed law to the Secretary of National Affairs for the regulation of the practice of medicine. The project will be presented to the house of representatives. The following regulations are proposed: that the only persons authorized to practice medicine or any of its branches are those who have a national diploma or a foreign diploma duly legalized. Foreign physicians with a legal diploma may be authorized to practice in places where there are no legal national physicians, when they have a diploma given in a foreign school, not as yet recognized in Argentina. In this case, however, if a legal national physician comes to that place the right to practice belongs to the national and not to the foreign physician. Foreign physicians who want their diplomas legalized should take an examination of all subjects studied during the entire course of medicine, and then they must pay 4,000 pesos (about $1,040) for their licenses. The law would apply to the practice of medicine, dentistry and obstetrics and to roentgenologists, hypnotists and other psychotherapists. Any advertising by physicians and any other persons practicing has to be authorized by the national department of public health. It is considered illegal to specify the time it may require for any cure, to say that any cure is infallible, to use secret or mysterious remedies, and to publish false or inexact statistics compiled from methods used. No physician is allowed to practice pharmacy and medicine simultaneously. Physicians, dentists or veterinary physicians who in any way are engaged in the preparation or sale of specifies, either as owners or as stockholders, are not allowed to practice their professions. However, physicians are authorized to enter into association with capitalists to establish sanatoriums as long as the capitalist does not interfere in any clinical or technical work of the sanatorium. The sharing of fees by physicians, as well as the remuneration given to them from drug stores, opticians and orthopedists, and any other conventional arrangement for the mutual benefit of the physician with some other person or institution, are forbidden. The law considers it advisable that nurses, masseurs, dental mechanics, clinical laboratories sanatoriums, maternity hospitals, medical and physical therapy clinics and eye clinics, should be under special regulations. This bill has been presented to congress for consideration. The laws that now govern the practice of medicine were made long ago and do not deal with certain problems of modern practice.

University Budget Reduced

The national government recently informed the board of directors of the University of Buenos Aires that two million pesos ($520,000) will be deducted from the allowance for the support of the university. With this reduction, the resources of the university, which had been already reduced two million pesos, will amount to six millions pesos ($1,560,000). Many protests have been presented to the government to effect a reconsideration. If this reduction becomes effective, the University of Buenos Aires will have a smaller budget than that of some other provinces in the country. The protests emphasize that the University of Buenos Aires supports a hospital, a college, a school of commerce, and research institutions. It has been suggested that it would be preferable to close the University of Litoral, the upkeep of which is expensive. This school has no university spirit. It has also been suggested that the medical school of La Plata be closed.

VIENNA

(From Our Regular Correspondent)

Nov. 20, 1932.

Prevention of Embolism

Professor Heyrovsky discussed recently, during a continuation course for general practitioners, a problem that has come to the forefront in recent years as to why, not only following operations but also in connection with internal disorders, embolism has increased to such a marked extent in all countries. Embolism is most commonly associated with diseases of the circulatory organs. In surgical cases it commonly develops after operation on the organs below the diaphragm. Women are affected from two to three times more frequently than men, while juveniles are commonly spared. Eighty-four per cent of the cases are in patients whose ages range from 40 to 70, and the statistics appearing since 1911 show a fourfold increase. Payr has found that 13 per cent of all deaths in clinics are traceable to embolism. Of 432,000 patients operated on, 0.235 per cent became victims of embolism. The highest mortality from embolism occurs in prostatectomy. The causes of the increase of thrombo-embolism remain still unclarified. The

thrombi originate, for the most part, in the veins of the lower extremities or of the pelvis. Fatal embolism usually results from long cylindric thrombi originating in the veins of the thigh. Death usually occurs unexpectedly, frequently in patients who are considered convalescent, the symptoms of thrombosis being either entirely absent or slight, because the dangerous thrombi are attached to the wall of the vein by one end, while the rest of the thrombus floats and is easily torn loose to lodge somewhere as an embolus. Thrombosis with edema is not so dangerous, because then the thrombi are attached to the wall of the vein for a considerable area and are not torn loose. Also in thrombophlebitis of the saphenous vein, "moderate" embolism is much less frequent than the tearing loose of small blood clots, which cause the much less dangerous lung infarcts. For the formation of thrombi, many are inclined to incriminate changes in the composition of the blood, disturbances of the circulation, and likewise injury of the intima of the veins in cases coming to operation; furthermore, in many persons there exists an inferiority of the veins of the lower extremities, possibly of hereditary origin. The prophylaxis must be based on mechanical, chemical and biologic factors. In persons with varices, who may possibly have had also phlebitis, it is advisable, before larger operations, to ligate the saphenous vein and to remove varices. During the operation the extremities should rest on a soft underlay and be held in place without much restraint. The heart and the circulatory organs must be carefully watched. After the operation the circulation of the veins of the legs and the pelvis should be mechanically stimulated by respiratory gymnastics, leg exercises, raising the foot of the bed, and possibly light massage. Venous stasis may thus be effectively combated. If, however, in spite of all efforts, a thrombus has formed, everything must be done to prevent it from becoming detached. The indications are then rest for the legs and raising of the head of the bed. Pains in the calf of the leg, in the pelvis and in the gluteal region are the first signs of a developing thrombosis, which usually presents the type of an ascending disorder and must be regarded as dangerous, whereas "descending thrombosis," which forms in the femoral vein, usually leads only to a disturbance of circulation. In any event, pains in the region of the pelvic veins (possibly due to hemorrhoids), combined with elevation of temperature and a high pulse rate, without assignable cause, are highly suggestive. Many authors are of the opinion that the administration of thyroidin or thyroxine as a prophylaxis against thrombosis is useful, but of course improvement of the heart action, and compensation of the water loss by hypodermoclysis or intravenous infusion, must not be neglected. Good results were secured also, following the appearance of small emboli, which usually precede the fatal embolism, by ligating the large veins (femoralis, iliaca, hypogastrica) in the healthy tissues.

Variations in the Onset of Puberty

In an address before the Wiener Medizinisches Doktoren-Collegium, Prof. R. Neurath discussed the problem of sexual maturation in man. The average time of such maturation for the population of the temperate zones ranges, in the Caucasian races, between the ages 13 and 15 for girls, and in boys the onset is usually from one to two years later, but slight fluctuations in one direction or the other are not infrequent. These fluctuations are influenced to a great extent by social and national, and often also economic, conditions. In the countries of the North (Scandinavia, for example), one often observes retardations up to the eighteenth and twentieth year in girls, while in Italy and Greece early onsets of puberty (ages 10 to 12) are noted. If, in a given region, the onset of puberty occurs at an age that belongs to childhood, one speaks of pubertas praecox. Pubertas tarda has aroused less interest. In the literature, about 400 cases of pubertas praecox in girls and about 100 cases in boys are recorded, about 15 per cent of which came to necropsy, which revealed important pathogenic characters. It may be said that sexual precocity is only the most prominent expression of the fairly uniform acceleration of development affecting the whole organism (hyperevolution). In both sexes a predevelopment of the whole organism and of the secondary sexual characters may usually be observed, although often such predevelopment is only partial. The external, and usually also the internal, reproductive organs resemble in form and size those of adults, and the larynx, hair growth and skeletal structure are developed far beyond the true age. The sexual functions are sometimes fully developed (menstruation) but are also sometimes defective. As regards the future life history of persons with pubertas praecox, the prognosis varies, depending on the anatomic basis of the condition. Such persons are at first well developed for their age, but their growth is soon checked (early closure of the bone sutures), so that their final height is below that of persons who mature normally. Professor Neurath proposed the following systematic division of pubertas praecox: (1) primary, constitutional precocity, (2) the precocity of endocrine origin associated with tumors of the sexual glands, then of the suprarenal glands, then of the pineal body, and then of other endocrine organs, and (3) cerebral precocity associated with cerebral disorders. Primary, constitutional precocity begins in early childhood, and often even in the fetus, and shows a rapid uniform general development of the body, with several years of childhood dropped out, as it were. This type offers a good prognosis as regards length of life and shows no anatomicopathologic basis. Tumors of the sexual glands (hypergenital puberty) produce, for varying intervals after birth, a rapid development of the body and early functioning of the gonads, with isosexual and heterosexual characteristics. If the tumor is removed, one often observes retrogression of the puberty symptoms. "Interrenal" precocity, associated with tumors of the suprarenal cortex, affects almost exclusively female children; one notes the virile hair growth, absence of the mammae, and the male type of musculature. Here, too, there have been examples of retrogression of the symptoms (reversibility) after a successful operation. Pubertas praecox of pineal origin attacks, on the other hand, almost exclusively boys. One observes rapid development of the body and of the secondary sexual characters, often also premature intelligence. Cerebral precocity is associated with various disorders of the brain and with tumors, abscesses and tuberous sclerosis, and may follow epidemic encephalitis. In pubertas tarda the outward manifestations are characters of childhood persisting a long time and retardation or blocking in the appearance of the sexual characters. The condition is much more frequent and more marked in boys. In this condition the hypogenital disturbance of development (eunuchoidism) plays the chief part. In this condition are found both the lanky type and the stocky type, which become especially distinct precisely at the time of puberty. During the discussion that followed, it was brought out that about 25 per cent of all the cases of hermaphrodism, observed in recent years, concerned bearers of tumors, blastomas on the germinal glands being especially frequent, with which pubertas praecox was often associated.

Marriages

WILLIAM H. JOYNER, Greenup, Ky., to Mrs. Clista Mullins of Orlando, Nov. 24, 1932.

RALPH S. SAPPENFIELD, Indianapolis, to Miss Zella Timmons in Pendleton, Oct. 26, 1932.

MELROSE EDMUND WEED to Mrs. Mary Stevenson Mitchell, both of Philadelphia, Sept. 10, 1932.

LOUIS F. KOMPARE, Waukegan, Ill., to Miss Mary Shifrer of Chicago, Nov. 24, 1932.

HUBERT SHATTUCK HOWE to Mrs. Estelle Hall Silo, both of New York, Dec. 26, 1932.

Deaths

Henry Daspit ⊕ New Orleans; Tulane University of Louisiana School of Medicine, New Orleans, 1907; professor of neurology and psychiatry at his alma mater and dean and professor of psychiatry, Graduate School of Medicine, Tulane University of Louisiana; fellow of the American College of Physicians; medical director and superintendent of the City Hospital for Mental Diseases; chief of staff of neuropsychiatry, Charity Hospital; aged 48; died, Dec. 19, 1932, of influenza and pneumonia.

Timothy E. Wilcox ⊕ Brigadier General, U. S. Army, retired, Washington, D. C.; Albany (N. Y.) Medical College, 1864; veteran of the Civil and Spanish-American wars; entered the regular army as an assistant surgeon in 1867 and retired as a brigadier general by operation of law in 1904; aged 92; died, Dec. 10, 1932, of arteriosclerosis and cerebral hemorrhage.

Preston C. Coleman, Colorado, Texas; University of Louisville (Ky.) School of Medicine, 1874; member and past president of the State Medical Association of Texas; councilor of the Second District Medical Society; fellow of the American College of Surgeons; for many years president and member of the school board; aged 79; died, Oct. 29, 1932.

Redding Hamilton Pate, Unadilla, Ga.; University of Maryland School of Medicine, Baltimore, 1898; past president of the Dooly County Medical Society; veteran of the Spanish-American War; mayor of Unadilla; formerly chairman of the county board of education; aged 60; died, Nov. 25, 1932, in Macon, of lobar pneumonia.

Robert Adrian Marcy, Litchfield, Conn.; New York University Medical College, 1882; member of the Connecticut State Medical Society; member of the school board; aged 72; on the staff of the Charlotte Hungerford Hospital, Torrington, where he died, Dec. 6, 1932, of pneumonia, following an operation for gallstones.

Francis Marion Mason ⊕ Danville, Ill.; Northwestern University Medical School, Chicago, 1894; fellow of the American College of Surgeons; on the staffs of the Lakeview and St. Elizabeth's hospitals; aged 66; died, Dec. 24, 1932, in the Passavant Memorial Hospital, Chicago, of carcinoma of the pancreas.

Christian Frederick Grimmer ⊕ Pekin, Ill.; University of Michigan Medical School, Ann Arbor, 1901; past president and secretary of the Tazewell County Medical Society; on the staff of the Pekin Public Hospital; aged 61; died, Dec. 9, 1932, of pneumonia.

Arthur S. Rogers, Saginaw, Mich.; University of Michigan Medical School, Ann Arbor, 1890; member of the American Academy of Ophthalmology and Oto-Laryngology; aged 70; died, Dec. 4, 1932, of injuries received in an automobile accident.

John Henry Spencer ⊕ Jacksonville, Ill.; American Medical College, St. Louis, 1892; county health officer; formerly county coroner; veteran of the Spanish-American and World wars; aged 65; died suddenly, Dec. 5, 1932, of heart disease.

Francis Glenn Smith, Hamilton, Ohio; Ohio-Miami Medical College of the University of Cincinnati, 1910; member of the Ohio State Medical Association; aged 47; died, Nov. 17, 1932, in the Mercy Hospital, of perforating duodenal ulcer.

Albert C. Kniskern, Pomona, Calif.; University of Vermont College of Medicine, Burlington, 1879; aged 83; died, Nov. 22, 1932, in the Nathan Littauer Hospital, Gloversville, N. Y., of arteriosclerosis and cardiorenal vascular disease.

William Sellars, Spokane, Wash.; Detroit College of Medicine, 1895; member of the Washington State Medical Association; aged 59; on the staff of the Deaconess Hospital, where he died, Nov. 26, 1932, of cerebral hemorrhage.

Jesse Monroe Cobb, Grove Hill, Ala.; Tulane University of Louisiana Medical Department, New Orleans, 1893; member of the Medical Association of the State of Alabama; aged 61; died, Dec. 4, 1932, of carcinoma of the throat.

Carl David Nelson, Persia, Iowa; University of Nebraska College of Medicine, Omaha, 1909; formerly president of the school board; aged 53; died, Nov. 14, 1932, in the Lord Lister Hospital, Omaha, Neb., of a skull fracture.

Chauncey S. Kenney ⊕ Newton, Kan.; Detroit College of Medicine, 1902; for many years superintendent of the State Sanatorium for Tuberculosis, Norton; aged 55; died, Dec. 1, 1932, in a local hospital, of heart disease.

William Thomas Seabury, Baltimore; Atlantic Medical College, Baltimore, 1908; member of the Medical and Chirurgical Faculty of Maryland; aged 53; died, Dec. 2, 1932, of heart disease and chronic nephritis.

John Baptiste Corbett, Providence, R. I.; Dartmouth Medical School, Hanover, N. H., 1897; New York University Medical College, 1897; aged 67; died, Dec. 5, 1932, of influenza and phlebitis with thrombosis.

George A. Richards, New Canaan, Conn.; College of Physicians and Surgeons, Medical Department of Columbia College, New York, 1886; aged 68; died, Nov. 2, 1932, of diabetes mellitus.

George A. Sloss, De Witt, Neb.; Michigan College of Medicine and Surgery, Detroit, 1899; aged 59; died, Nov. 25, 1932, in a hospital at Beatrice, following an operation for appendicitis.

Walter Peters, Cleveland; University and Bellevue Hospital Medical College, 1905; on the staff of the Glenville Hospital; aged 59; died, Dec. 10, 1932, of uremia and chronic interstitial nephritis.

William H. Klayer, Norwood, Ohio; Miami Medical College, Cincinnati, 1897; also a lawyer and a pharmacist; aged 62; was found dead, Nov. 25, 1932, of a self-inflicted bullet wound.

William Charles Ray Graham, Brasher Falls, N. Y.; McGill University Faculty of Medicine, Montreal, Que., Canada, 1892; aged 64; died, Nov. 26, 1932, of cerebral hemorrhage.

John McCallum McInnis, Brooklyn, Miss.; University of the South Medical Department, Sewanee, Tenn., 1898; aged 64; died, Nov. 22, 1932, of cerebral hemorrhage.

John Winfield Monsted, New London, Wis.; Detroit College of Medicine, 1894; member of the board of education; aged 62; died, Nov. 29, 1932, of pneumonia.

John Morris Kane, San Francisco; Cooper Medical College, San Francisco, 1893; aged 62, died, Nov. 20, 1932, of coronary artery occlusion and chronic duodenal ulcer.

Harry Jesse Gilbert ⊕ Newark, N. J.; University of Maryland School of Medicine, Baltimore, 1915; aged 48; died, Dec. 6, 1932, of cellulitis and pulmonary infarct.

William Augustus Pratt, New York; Bennett College of Eclectic Medicine and Surgery, Chicago, 1895; aged 60; died suddenly, Nov. 25, 1932, of heart disease.

Samuel A. Smith ⊕ Carbon, Ind.; Illinois Medical College, Chicago, 1904; aged 64; died, Dec. 10, 1932, in the Clay County Hospital, Brazil, of cerebral hemorrhage.

John Mann, Norfolk, Va.; Medical College of Virginia, Richmond, 1894; aged 61; died, Oct. 31, 1932, of cardiac vascular sclerosis and cerebral hemorrhage.

Eliza Ellen Maples Morris, East Bernstadt, Ky.; Woman's Medical College of Cincinnati, 1894; aged 70; died, Nov. 27, 1932, of cerebral hemorrhage.

Albert Sidney Riddle, Stillwater, Okla.; Georgia College of Eclectic Medicine and Surgery, Atlanta, 1889; aged 70; died, Nov. 29, 1932, of heart disease.

John Owen Kirkpatrick, Nashville, Tenn.; University of Louisville (Ky.) School of Medicine, 1870; aged 85; died, Nov. 23, 1932, of arteriosclerosis.

Charles C. Ransom, Potomac, Ill.; Hahnemann Medical College and Hospital, Chicago, 1890; aged 72; died, Nov. 24, 1932, of gastro-enteritis.

Arthur Le Roy Blunt, Chicago; Bennett College of Eclectic Medicine and Surgery, Chicago, 1888; aged 76; died, Nov. 7, 1932, of myocarditis.

Frank William McNamara, Cincinnati; Cincinnati College of Medicine and Surgery, 1901; aged 53; died, Dec. 6, 1932, of cerebral hemorrhage.

Daniel William White ⊕ Tulsa, Okla.; Jefferson Medical College of Philadelphia, 1906; aged 51; died, Oct. 31, 1932, in a local hospital.

S. J. Ross, Schultz, W. Va. (licensed, West Virginia, 1897); aged 80; died, Nov. 9, 1932, of cerebral hemorrhage and arteriosclerosis.

William A. Graham, Hayesville, N. C. (licensed, North Carolina, 1889); aged 77; died, Nov. 26, 1932, of cerebral hemorrhage.

Hanson Julius Kofoed, Chicago; Jenner Medical College, Chicago, 1913; aged 62; died, Nov. 26, 1932, of chronic myocarditis.

Lester Cameron Smith, Omro, Wis.; Rush Medical College, Chicago, 1883; aged 73; died, Nov. 26, 1932, of chronic nephritis.

Clement Edwin Reed, Detroit; Detroit College of Medicine, 1913; aged 55; died, Nov. 21, 1932, of septicemia.

Correspondence

DEATHS OF M. ALLEN STARR AND JOSEPH FRANCIS BABINSKI

To the Editor:—Neurologic science has lost two outstanding figures this past fall—one in the death of M. Allen Starr of New York, at the age of 78, and the other of Joseph Francis Babinski of Paris, at the age of 75. They were contemporaries and occupied in their respective countries analogous positions of eminence and renown. Dr. Starr, it is true, had ceased to be neurologically active now for some years, as he became professor emeritus in 1915; but Babanski kept up his clinical work until comparatively recent years, when an advancing parkinsonism made it uncomfortable to go on.

Starr and Babinski had something in common in their masterly skill at case presentation. They were both marvelous teachers. Babinski was the greater neurologist. This constitutes no derogation of Starr, since one might state Babinski was in a class all by himself, not only as brilliant a teacher as was Starr, but a brilliant clinical observer of new material and a ceaseless investigator and producer. Had Starr been a poor man it is not unlikely that he would have risen to as great heights as his Paris confrère.

It has been my privilege to work with both of these masters in neurology. Starr was very helpful to my father, who was trying to develop, as a pedagogue, the now fairly well acknowledged idea that in teaching children "there was a tide in the affairs of men," and that maturity in anatomic patterns was essential before there could be development in behavior patterns. He was always helpful to me in my fifteen years' work at the Vanderbilt Clinic. He could not, however, quite forgive me my freudian inclinations.

I first met Babinski when in 1891, as a greenhorn, I was in Paris and attended some of Charcot's clinics. I was hardly aware at that time—so backward were the medical schools in the nineties of historical medicine—of his eminence. I can dimly recall but one of these early dramatic lectures of Charcot, who in 1891 was just beginning to suffer from the illness that caused his death a few years later, in 1893.

Babinski was assistant in the Salpêtrière clinic at this date, but I have no distinct recollection of him at this time or of Janet, who had just about then come from Havre, where he had been teaching philosophy, to take up his studies for a medical degree, which was awarded him in 1893. I mention this detail since some writers have tried to make out that Janet was an assistant of Charcot's when Freud was there in 1885, six years previously.

On a later visit to Europe, in 1906, I was much impressed by Babinski's great personality as a teacher but I attended only a few of his demonstrations in the old Pitié. In 1909, however, I spent six months in Paris, with a few weeks out to go to Lourdes, and attended his weekly conferences with great interest. Here his patients, male and female, came before the students completely stripped. Thus he could demonstrate without hindrance the various reflex activities which he has made so familiar in various disorders of the peripheral and central nervous system. He invariably tested out the labyrinthine functions electrically. I was never quite convinced that his formula for pithiatism was completely valid and that a separate group to which this term could be applied was separable from the conversion hysterias, although at that time, 1909, my intimate touch with the freudian formulations was only beginning. Here in Paris I was listening to Janet and his conceptions, was daily making rounds with Dejerine and hearing his ideas, and then listened to Babinski. None of the formula seemed to get at the dynamics of the situations. Babinski's ideas of suggestion and persuasion were too stereotyped and simple. Dejerine's big hearted confidence and bonhomerie with his neurotic patients and his entering into the details of their emotional life came nearer to Breur and Freud's catharsis. Janet's meticulous and detailed case history taking, which now as I look back on it was evidently of much value, was boring, though in his expositions Janet was brilliant and inspiring. His work seemed more fitted for literature at that time, and even now there seems too much irrelevant elaboration with little inner connection.

While it was true that Babinski could persuade a pithiatic anesthesia to disappear, much as I had witnessed it to disappear under the brutal electric spark treatment which was orthodox in English and some German clinics, yet the conversion mechanism found some other organ of the body to carry the conflict. These patients were never cured. The content remained the same even if the form varied. It was only when an explanatory analysis in terms of the affective adjustments was carried out that the patients were really "cured."

I saw Babinski but once after the war. He was then in his new Pitié clinic. At my last visit in 1929 he was not there. He was ill and his assistant for many years, Jarkowsky, gave his clinic.

SMITH ELY JELLIFFE, M.D., New York.

MORBIDITY IN TUBERCULOSIS

To the Editor:—I was interested and somewhat concerned on reading the communication entitled "Statistics of Morbidity in Tuberculosis," by Dr. J. A. Myers of Minneapolis (THE JOURNAL, Dec. 10, 1932, p. 2050). Dr. Myers brought up a big problem in public health related to immunity in tuberculosis, over which many physicians may well ponder. The answer seems to lie at the root of all our tuberculosis work.

I agree with Dr. Myers that there does occur a form of immunity in tuberculosis, but I am convinced that it is only transient and relative. If one should receive large and frequent doses of tubercle bacilli, there is little chance of escaping clinical tuberculosis, regardless of whether there has been a previous primary infection or not.

Some writers classify calcified tuberculous lesions in children as actual disease. I maintain that calcified lesions, without any other evidence of the disease, present a good example of relative immunity, similar to the positive reaction to the Mantoux test. Dr. Myers might be interested to know that during the past five years over 9,000 tuberculin tests (90 per cent Mantoux) have been given to children under 15 years of age in the county department of health at Los Angeles. The average age is about 10 years. At the present time, in unselected cases, these tests are running 16 per cent positive, while in the beginning they were almost twice that high.

Dr. Myers is apparently apprehensive of the time when there will be too few tubercle bacilli to go round. Should this ever occur, would there be a catastrophe? I think not. For example, all agree that things are much better than they were half a century ago, the incidence of tuberculosis being greatly reduced. Well, then, there is only one way of judging the future, and that is by the past; and the past has spoken.

To look at this from another angle, the contacts to the few tuberculous patients remaining would be no worse off than they are at present, as all people must have the first time to be infected. Furthermore, there is no definite proof that the time of this initial or primary infection, if extended to adult life, would be more dangerous than it is in children. The contrary seems to be true. It has been said that a person is most unfortunate who has never had a tuberculous infection. I prefer to be one of the unfortunates.

I think that the present system of attacking the problem of tuberculosis is sound; namely, getting rid of the source of infection, as has been done in typhoid and other diseases.

MERL LEE PINDELL, M.D., Los Angeles.
Roentgenologist, Los Angeles County General Hospital Outpatient Department.

Queries and Minor Notes

ANONYMOUS COMMUNICATIONS and queries on postal cards will not be noticed. Every letter must contain the writer's name and address, but these will be omitted, on request.

HEART SYMPTOMS FOLLOWING PREGNANCY

To the Editor:—I have a patient, aged 25, in whom following a normal pregnancy about three years ago a rapid heart developed. The blood count and the basal metabolism were normal. There were no physical observations to account for this condition. Eleven months ago she again became pregnant, and after the first three months of pregnancy this condition left her and she felt fine. Her second baby is now 3 months old, and symptoms of weakness and palpitation have returned. Her heart beats at a rate of 100 to 110, with no physical observations to account for it. Is it possible that the fetus supplies this patient with something that is otherwise lacking, or is there some other possible explanation for the symptoms disappearing during pregnancy and then returning in a short time after confinement?

R. E. JERNSTROM, M.D., Rapid City, S. D.

ANSWER.—In spite of the normal basal metabolism test, the cause of the rapid heart in this case is most likely a disturbance in the function of the thyroid gland. It is possible that during pregnancy the fetal thyroid assisted in the metabolism of the mother. A slight argument in favor of this is the fact that improvement did not take place until the beginning of the fourth month of gestation. Aside from this there is normally during pregnancy an increased activity of the thyroid gland and a distinct change in the body metabolism. It is more probable, however, that the changes that occur in the glands of internal secretion, particularly the thyroid, in the pregnant woman, account for the alteration in the pulse rate. The patient should have at least one more basal matabolism test to make certain of the thyroid function at the present time. Regardless of the result, which cannot be extreme, it would be worth while having the patient take iodine in some form or another, such as compound solution of iodine, for a week or ten days to see what effect it has on the pulse. An improvement will probably be noted.

CURETTEMENT UNDER LOCAL ANESTHESIA

To the Editor:—In THE JOURNAL, Nov. 26, 1932, in answer to M.D., Texas, on "Menorrhagia," you end by saying "A curettement has not infrequently helped women like the one described . . . and this operation can readily be done under local anesthesia." Please send me as soon as possible the method of anesthetizing the uterus for curettement.

M.D., Nebraska.

ANSWER.—The surgical preparation of the vagina is, of course, the same as when inhalation anesthesia is employed. The patient should be given a hypodermic of ¼ grain (16 mg.) of morphine and $\frac{1}{200}$ grain (0.3 mg.) of scopolamine at least thirty minutes before the infiltration is to be begun. The narcosis due to morphine persists for a variable length of time after the operation is ended and this usually insures that the patient will sleep or at least be comfortable for some time after the operation.

The patient should be made as comfortable as possible during the operation. Hence abundant pillows should be placed on the operating table, especially under the back and around the shoulders where braces are usually applied. For the local anesthetic, 0.5 per cent of procaine hydrochloride is used. To this solution after sterilization, two drops of 1 : 1,000 epinephrine are added for each ounce. About 6 ounces of solution is prepared.

The technic for dilation and curettement is as follows: A narrow retractor is used to depress gently the posterior vaginal wall. If the patient has a narrow vagina or a rigid perineum, solution should also be injected into the perineum as follows: The needle is inserted about midway down one labium majus and solution is injected all along the edge of this labium, then across the fourchette and up the edge of the other labium majus. It is usually necessary to remove and reinsert the needle a few times, but one must always reinsert the needle in an area which has already been infiltrated. With Allis forceps, slight traction is then made on the infiltrated fourchette and solution is injected into the layer between the vaginal wall and the rectum not only in the midline but also well out to the sides in the shape of a fan. The needle is inserted about 5 cm. in each direction, and about 30 cc. of solution is distributed in this space. In some cases it is necessary to insert the needle deeply through the fascia over each levator ani muscle and inject about 10 cc. of solution into the muscles and fascial layers. Then the cervix is grasped with a tenaculum and gently pulled down and to the right side. The needle, which should be long and flexible, is then inserted into the left parametrium by following closely along the cervix for a distance of about 2 to 3 cm. If any resistance at all is met, the needle has most likely penetrated the cervix. In this case it should be pulled back slightly and then inserted a little more latterally. After the needle is in the parametrium, the plunger should be pulled up slightly to make certain that the needle has not entered a blood vessel. If no blood appears in the barrel of the syringe, about 10 cc. of solution is injected slowly and with the needle constantly but gradually being withdrawn. The same procedure is carried out on the right side of the cervix. The procaine hydrochloride in the parametria blocks the large sympathetic ganglions of Frankenhaüser, which are situated at the upper portion of the cervix. The local anesthesia produces blanching of the vaginal mucosa around the cervix. If parts of the vaginal epithelium are not blanched, it is best to inject about 5 cc. of solution into the space between the cervix and the bladder and between the cervix and the rectum. It is a good plan to administer a hypodermic of pituitary extract when the operation is begun in order to insure a minimal loss of blood from the uterus.

After waiting about five minutes it will be found that the cervix is soft enough to permit easy dilation without pain. Curettement is likewise a painless procedure and there is little bleeding. The uterus retains its tonicity even if pituitary extract is not used. Occasionally the patient experiences slight pain when the corners of the uterus are curetted. One should not undertake to curet the uterus without a thorough knowledge of its anatomy or without an understanding of pathologic conditions that may be present.

CONSTITUTIONAL TYPES OF CRIMINALS

To the Editor:—I am rather interested in psychopathology and psychiatry as applied to criminology and other branches of sociological science. Perhaps there are no statistical data to furnish an answer to these questions but I thought it might be possible that some authority has expressed an opinion. Using the "personality types" suggested by Jung, are professional criminals (such as gangsters) generally of the introvert or schizoid type of personality, or are they usually extroverts? The "plotting villains" of fiction are almost invariably pictured as of the introverted type, but at least one famous criminal of America is a "pyknic." Please omit name.

M.D., Michigan.

ANSWER.—There is, of course, no one type of criminal, and just as wide variations are to be found, both as to body and as to personality type, as among the population at large. Many studies of this problem have been and are being made. An example is to be found in Mohr and Gundlach: Relations Between Physique and Performance in Criminals (*J. Exper. Psychol.* **10**:117 [April] 1927). In such studies it is usual to divide the criminals according to the type of crime of which they have been convicted. In brief, those convicted of crimes of fraud most often have tall, heavy frames of athletic-asthenic or pyknic type; in crimes of violence, the bodies of convicts are the largest and most robust of all; in crimes of the nature of burglary, larceny and hold-up, the offenders show fairly evenly distributed types of body build. Theoretically, one would expect that crimes of fraud would show a larger proportion of introvert personalities, whereas crimes of violence would reveal more extrovert characters. However, actual studies reveal no clear-cut distinctions as yet. This is not surprising when it is realized that the personality types, like the body types, are far from being entities; every person is only more or less introvert and the problem is not a simple one of all or none.

YELLOW CHROMIDROSIS

To the Editor:—A healthy ordnance worker, aged 46, eating a normal mixed diet and not taking drugs, complains that his perspiration stains the underclothing, bed linens and handkerchiefs (on mopping the face and forehead) a rich cream yellow. These stains were first noted approximately two years ago and have become more pronounced. Ordinary laundering does not completely remove the stain. Common routine studies of the urine and the blood are negative. The perspiration is acid in reaction to litmus. Black powder (Chilean saltpeter, sulphur and charcoal), hydrochloric acid, sal ammoniac vapor and acacia are encountered occupationally. Neither the members of the family nor fellow workmen are similarly affected. What is the nature of this anomaly? What chemicals, if any, are implicated? What further investigation and corrective measures are recommended?

J. A. MILLSPAUGH, M.D., Keyport, Wash.

ANSWER.—True yellow chromidrosis is so rare as to constitute a medical curiosity rather than a disease.

No proof exists that any one of the industrial agents mentioned in the query may be the source of yellow perspiration. Ordnance workers manipulating trinitrophenol and similar organic explosives conceivably might secrete a yellow sweat, but this is not proved.

The best known publication dealing with yellow sweating is that of Heidingsfeld (THE JOURNAL, Dec. 13, 1902, p. 1519), who says:

Chromidrosis is not, as its name implies, an anomaly of sudoriferous secretion. Judging from the limited number of cases in the literature, and as a matter of common observation, it is an exceedingly rare affection as regards forms characterized by yellow and brown, and probably black, blue, green and intermediate shades of discoloration. Red chromidrosis is an entirely different and by no means an infrequent type of affection, with an extraneous cause, probably some form of erythro-micrococcus-tetragenus infection from individual to individual, and yielding to anti-parasitic remedies. In the light of this investigation the pigmented elimination, in the yellowish-brown forms at least, is insoluble in water, alcohol, ether, etc., is readily soluble in chloroform, stains linen indelibly, shows no reaction when treated with ordinary reagents, and is amorphous, homogeneous and resinous in character. Pathological examination reveals the sudoriferous glands of the affected area to be normal, sebaceous glands absent, a hyperkeratosis around the openings of hair follicles and pigment accumulations near the hair follicles, in the stratum corneum, lower layers of the rete, and the adjacent cutis. The pigment is grouped in cell-like masses, is not finely granular and does not bleach with hydrogen dioxid like chromophores. Spectroscopic examination of the eliminated pigment reveals no absorption bands and hence it is not a derivative of oxyhemoglobin. In view of the pathologic findings, the absence of sebaceous glands, the normal condition of the sudoriferous glands, cases of so-called chromidrosis (excluding red forms) are anomalies of pigmentation and not glandular secretion.

This author, in describing his case of yellow-brown chromidrosis, indicates many investigative procedures, some of which might be helpful in further inquiry into the present case.

DICK TEST FOR SCARLET FEVER

To the Editor:—The Dick test is supposed to be read in twenty-four hours, I believe. Recently I made the test on three nurses; they were all negative in twenty-four hours, but in two of the three marked reactions developed on the third day. The erythema was about 3 cm. in diameter and was followed by desquamation. In the other nurse a reaction never developed exceeding 0.5 cm. in diameter at any time. Should these delayed reactions be considered positive and indicate immunizing treatment? Does this mean that a single twenty-four hour reading of the test is unreliable? Please omit name. M.D., Montana.

ANSWER.—The Dick test should be read in twenty-four hours. A delayed reaction as described is suggestive of something wrong with the skin test solution or with the syringe or needle used. It is not to be taken as an indication for immunization but is to be taken as an indication for another skin test properly made.

CAUSTIC EFFECTS OF ETHYLHYDROCUPREINE (OPTOCHIN) UNLIKELY

To the Editor:—Please advise me whether optochin (ethylhydrocupreine) of excessive strength, aqueous solution, used in the eye, would cause a burn of the cornea, resulting in a corneal scar. Please omit name.

M.D., Georgia.

ANSWER.—Probably not. As far as can be found in a rather exhaustive search of the literature, there have been no caustic effects on the cornea ever recorded. It has been used in a concentration of 10 per cent experimentally without any untoward results, and 1 and 2 per cent solutions have been injected subconjunctivally without harmful effects. It has been given internally in solid form in pneumonia without any caustic effect on the mucosa of the stomach.

SODIUM CHLORIDE IN HYPERTENSION

To the Editor:—A patient of mine has asked the following questions with reference to table salt: Is it the sodium or the chloride in table salt that does the harm to patients having high blood pressure? If the kidneys are normal, will salt do any harm in high blood pressure?

LOUIS L. SHERMAN, M.D., Oakland, Calif.

ANSWER.—It is problematic whether the moderate ingestion of sodium chloride does any harm to patients with hypertensive arterial disease without appreciable renal impairment. Excesses of salt, as excesses of any constituent of the diet, are unwise (Trusler, H. M.: Disturbances in Sodium Chloride Metabolism, THE JOURNAL, Aug. 25, 1928, p. 538). There is a division of opinion as to the advisability of a rigid "salt free" regimen in the management of hypertensive disease, but the majority of clinicians who have thoroughly considered the problem are inclined to conclude that the moderate use of salt (as ordinarily used in cooking, without additional salt at table) is noninjurious (Strouse, Solomon, and Kolman, S. R.: *Tr. A. Am. Phys.* **37**:531, 1923. Stieglitz, E. J.: Arterial Hypertension, New York, Paul B. Hoeber, Inc., 1930). If any injury does occur, it is probably more attributable to the sodium ion than to the chloride ion. The use of potassium salts to replace sodium chloride has been suggested (Addison, W. L. T.: *Canad. M. A. J.* **18**:281 [March] 1928). In the absence of renal functional impairment the moderate ingestion of table salt will not harm the hypertensive patient.

INDICATIONS FOR PROSTATECTOMY

To the Editor:—A man, aged 62, with fibroid tuberculosis and generalized arteriosclerosis with an accompanying heart disease of the same type with severe auricular fibrillation, has hypertrophy of the prostate with 8 ounces of urinary retention. The urine is loaded with pus. Would any operation for the removal of the prostate be considered at all? What treatment would you advise? Please omit name and address.

M.D., Tennessee.

ANSWER.—It would be difficult to state from this description whether a correction of the prostatic obstruction should be carried out; but in all probability a patient with 8 ounces of urinary retention, with infection, is certain to have his condition progress and add much to his other troubles. It might be reasonable to state that he should have some form of bladder drainage (indwelling catheter or suprapubic cystotomy under local anesthesia) and when the infection in the urinary tract has been cleared up, the obstruction corrected by transurethral electroresection.

DIETS IN BRONCHIAL ASTHMA

To the Editor:—Will you kindly let me know where I can get information regarding diets in chronic bronchitis and bronchial asthma? I understand there is a Vaughan diet and one described by Rowe.

J. W. HOPKINS, M.D., Glendale, Calif.

ANSWER.—The diets described in the following works are intended primarily for the treatment of cases of bronchial asthma. It is possible, of course, that these diets might also aid some patients with chronic bronchitis. The list is by no means complete, but it represents the efforts of the leading workers in this field:

Rowe, A. H.: Food Allergy, THE JOURNAL, Nov. 24, 1928, p. 1623.
Rowe, A. H.: Food Allergy, Philadelphia, Lea & Febiger, 1922.
Laroche, Richet, and Saint-Girons: Alimentary Anaphylaxis, translated by Mildred P. Rowe and Albert H. Rowe, University of California Press, 1930.
Vaughan, W. T.: Allergic Migraine, THE JOURNAL, April 30, 1927, p. 1383.
Vaughan, W. T.: Allergy and Applied Immunology, St. Louis, C. V. Mosby Company, 1931.
O'Keefe, E. S., and Rackemann, F. M.: THE JOURNAL, March 16, 1929, p. 883.
Vallery-Radot, Pasteur, and others: Nutrition, Paris, G. Doin & Cie, vol. 1, No. 2, 1931.

EPINEPHRINE OR EPHEDRINE IN CORONARY THROMBOSIS

To the Editor:—I should like to be advised whether the use of epinephrine and ephedrine is contraindicated in a case of coronary thrombosis complicated by an occasional attack of severe asthma. The coronary thrombosis is of six years' standing and this patient has had two or three coronary episodes during the past six years. During the last attack of asthma he went into fibrillation, necessitating the administration of digitalis. Would it be reasonably safe to administer epinephrine or ephedrine along with a narcotic during the asthmatic attack, in view of the unquestionable coronary occlusion complications? Please omit name.

M.D., West Virginia.

ANSWER.—The answer would depend somewhat on the age of the patient and on other evidences of cardiac disease, such as the size of the heart, the condition of the valves, the electrocardiogram and the blood pressure. With auricular fibrillation, if accompanied by dyspnea, digitalis would certainly be all right. It would be reasonably safe to use epinephrine and ephedrine and narcotics if other measures failed to relieve the severe asthmatic seizures.

INCREASED LIBIDO AFTER THE MENOPAUSE

To the Editor:—I have read with interest your answer to the correspondent who relates a case of increased sexual libido after the menopause. The two reasons that you give for the occasional increase in the libido in women after the menopause are correct. But there is a third factor which you have failed to mention, and that is the disappearance of the fear of pregnancy which follows the menopause. All know that on many women the fear of pregnancy acts as a terrifying specter. It hangs over their heads as a sword of Damocles and prevents them from normally enjoying the sex act. Many of them are laboring under the impression that if they restrain themselves, if they do not let themselves go, the danger of pregnancy will be greatly lessened. Some even think that pregnancy is impossible if they do not participate and do not permit themselves to reach an orgasm. I have known many women who were considered frigid and who had never enjoyed the sex act until after their menopause. WILLIAM J. ROBINSON, M.D., New York.

Council on Medical Education and Hospitals

COMING EXAMINATIONS

ALASKA: Juneau, March 2. Sec., Dr. Harry C. DeVighne, Juneau.

AMERICAN BOARD FOR OPHTHALMIC EXAMINATIONS: Milwaukee, June 12. Sec., Dr. William H. Wilder, 122 S. Michigan Blvd., Chicago.

AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY: The *written* examination will be given in cities of the United States and Canada where there is a Diplomate who may be empowered to conduct the examination, April 1. The *general oral, clinical and pathological* examination will be held in Milwaukee, June 13. Sec., Dr. Paul Titus, 1015 Highland Bldg., Pittsburgh.

AMERICAN BOARD OF OTOLARYNGOLOGY: Milwaukee, June 12. Sec., Dr. W. P. Wherry, 1500 Medical Arts Bldg., Omaha.

CALIFORNIA: Los Angeles, Feb. 27 to March 2. Sec., Dr. Charles B. Pinkham, 420 State Office Bldg., Sacramento.

CONNECTICUT: *Basic Science.* New Haven, Feb. 11. Prerequisite to license examination. Address, State Board of Healing Arts, 1895 Yale Station, New Haven.

NATIONAL BOARD OF MEDICAL EXAMINERS: The examination will be held in centers where there are five or more candidates, Feb. 13-15. Ex. Sec., Mr. Everett S. Elwood, 225 S. 15th St., Philadelphia.

NEVADA: *Reciprocity.* Carson City, Feb. 6. Sec., Dr. Edward E. Hamer, Carson City.

NEW YORK: Albany, Buffalo, New York, Syracuse, Jan. 30–Feb. 2. Chief, Professional Examinations Bureau, Mr. Herbert J. Hamilton, Room 315, State Education Bldg., Albany.

VERMONT: Burlington, Feb. 15-17. Sec., Dr. W. Scott Nay, Underhill.

WYOMING: Cheyenne, Feb. 6. Sec., Dr. W. H. Hassed, Capitol Bldg., Cheyenne.

Idaho October Report

Hon. Emmitt Pfost, commissioner of law enforcement, reports the oral and written examination held in Boise, October 4-5, 1932. The examination covered 13 subjects and included 130 questions. An average of 75 per cent was required to pass. Five candidates were examined, all of whom passed. Eleven physicians were licensed by endorsement. The following colleges were represented:

College	PASSED	Year Grad.	Per Cent
George Washington University School of Medicine		(1931)	93
State University of Iowa College of Medicine		(1931)	88, 93
Columbia University College of Physicians and Surgs.		(1908)	87
University of Oregon Medical School		(1931)	91

College	LICENSED BY ENDORSEMENT	Year Grad.	Endorsement of
College of Medical Evangelists		(1932)	N. B. M. Ex.
Stanford University School of Medicine		(1930)	California
Georgetown University School of Medicine		(1931)	Penna.
General Medical College, Chicago		(1923)	Illinois
Loyola University School of Medicine		(1921)	S. Dakota
Northwestern University Medical School		(1931)	Penna.
Rush Medical College		(1931)	California, Washington
University of Minnesota Medical School		(1927)	Minnesota
St. Louis University School of Medicine		(1930)	Missouri
University of Oregon Medical School		(1929)	N. B. M. Ex.

Connecticut July Report

Dr. Thomas P. Murdock, secretary, Connecticut Medical Examining Board, reports the written examination held in Hartford, July 12-13, 1932. The examination covered 7 subjects and included 70 questions. An average of 75 per cent was required to pass. Thirty-two candidates were examined, 27 of whom passed and 5 failed. The following colleges were represented:

College	PASSED	Year Grad.	Per Cent
Yale University School of Medicine		(1927)	80.1, (1928) 82.8,* (1930) 77.8, (1932) 80.5
Emory University School of Medicine		(1931)	76.3*
Rush Medical College		(1932)	82.1
Johns Hopkins University School of Medicine		(1930)	82.5, 89.5
Boston University School of Medicine		(1932)	79.5, 80.3
Harvard University Medical School		(1925)	81.1
Tufts College Medical School		(1930)	78.1, (1931) 76.4, 78.3, 79.1, 80.2, 81.9, 83.9 *
University and Bellevue Hospital Medical College		(1931)	83.4,* (1932) 84.9
Jefferson Medical College of Philadelphia		(1931)	75,* 82.1*
University of Pennsylvania School of Medicine		(1931)	84
University of Pittsburgh School of Medicine		(1928)	77.7*
University of Vermont College of Medicine		(1931)	79.7*
University of Toronto Faculty of Medicine		(1928)	81.6
McGill University Faculty of Medicine		(1921)	80.4

College	FAILED	Year Grad.	Per Cent
Georgetown University School of Med.	(1930) 70.1,	(1931)	71.6
George Washington University School of Medicine		(1930)	70.5
University of Louisville School of Medicine		(1931)	66.2
Osteopath			†

Thirty-one candidates were licensed by endorsement from July 30 to Oct. 10, 1932. The following colleges were represented:

College	LICENSED BY ENDORSEMENT	Year Grad.	Endorsement of
Yale University School of Medicine	(1929, 3), (1932) N. B. M. Ex.	(1929)	New York,
Johns Hopkins University School of Medicine	(1929, 2) Maryland	(1901)	New York,
Harvard University Medical School		(1928, 2), (1929, 2)	N. B. M. Ex.
Tufts College Medical School		(1929)	Tennessee, (1930, 2) N. B. M. Ex.
Columbia University College of Phys. and Surgs.		(1929)	New York
Long Island College Hospital		(1930)	N. B. M. Ex.
Syracuse University College of Medicine		(1922)	New York
University and Bellevue Hospital Medical College		(1930)	N. B. M. Ex.
University of Rochester School of Medicine		(1930)	N. B. M. Ex.
University of Cincinnati College of Medicine		(1919)	New York
Pennsylvania Department of Medicine		(1898)	New York
Temple University School of Medicine		(1926)	Penna.
University of Pittsburgh School of Medicine		(1927)	Penna.
Woman's Medical College of Pennsylvania		(1925)	Penna.
University of Vermont College of Medicine		(1931, 2)	N. B. M. Ex.
University of Toronto Faculty of Medicine	(1925) New York, (1929) Michigan	(1924)	Minnesota,
McGill University Faculty of Medicine		(1930)	N. B. M. Ex.

* The licenses of these applicants have not as yet been issued.

† Failed in both medicine and surgery.

Book Notices

Tuberculous Disease in Children: Its Pathology and Bacteriology. By John W. S. Blacklock. Medical Research Council, Special Report Series, No. 172. Paper. Price, 3s. Pp. 155, with illustrations. London: His Majesty's Stationery Office, 1932.

This is probably the best book on the subject in the English language. It fills in the gaps left in the work of others. As the author corroborates most of the fundamental pathologic and pathogenic features observed by his predecessors, and as the London correspondent (THE JOURNAL, Nov. 12, 1932, p. 1700) has reviewed many aspects of this work, only the important parts not sufficiently emphasized are here reviewed.

The material was selected from 1,800 consecutive necropsies at the Royal Hospital for Sick Children, Glasgow. Of this number, 283 (15.7 per cent) were found positive for tuberculosis. Owing to the method of selection, many patients who were obviously tuberculous were sent to tuberculosis dispensaries by private physicians, so the material is not a cross section of all the tuberculous material in the community. In fact, most of the other reports, with the possible exception of Parrot's, likewise have not included all the tuberculosis in the community. Much of the most serious as well as the mildest infections are not included. The disease had developed in many of the children as a result of a lowering of the tissue resistance by other diseases, thus permitting the latent foci or latent bacilli to become active. This is mentioned because the tuberculin reactions, although coinciding well with the postmortem observations, do not coincide with those of Bernard or Meyers in widely separated parts of the world. Blacklock's figures on these hospital tuberculous patients reveal that only 2.6 per cent of the children during the first two years of life died of other causes than tuberculosis, while Bernard's figures in Paris reveal that of infants reacting to tuberculosis under two years of age in a nursery of contact children, 74.9 per cent never presented any clinical disease. Meyer's figures are similar. It would be interesting to know the figures in Scottish infants in which similar studies were carried out. Although the size and number of doses of bacilli will certainly cause various types of lesions in different instances, it is doubtful whether this huge discrepancy can be accounted for on this basis. One cannot escape the impression that the Scotch children appear to be more susceptible than many of the more industrialized races. In fact, most of the Celtic race with the northern Scandinavians seem to be half way between the industrialized races and the primitive, with regard to severity and tuberculous infection. It would not seem to be so much the nature of racial quality, however, as lack of industrialization (and tuberculization) generally. The pastoral peoples always possess more of virgin soil.

This is borne out further by the type of lesions. The lesions tended more to be caseous and lacked fibrosis and calcification. For example, in Ghon's series, which was quite similar in size and mode of selection, there were 24 per cent of calcification, while Blacklock's revealed only 6.5 per cent. In other parts of the world the roentgen diagnosis is aided by calcification

(McPhedran, Meyers, Chadwick). Here again, however, one must pause to question whether these Scotch children, mostly of poor families, may not have suffered more from huge dosage than the middle class children of the others.

The tuberculin reactions were sufficiently corroborative for the average methods and dosage. The few that were positive that did not show any lesions (7.5 per cent Mantoux) may easily have been overlooked pathologically, while the 8.5 per cent Mantoux reactions negative with lesions may have been due to small dosage, temporary anergy or other factors well known to those working in this field.

Most of the pathologic anatomy, although not as detailed as that of some German authors, is largely a confirmation of previous work without much of the theoretical discussion.

There were three main routes of infection observed in the series: aerogenous or bronchiogenic, gastro-intestinal and cervical (tonsillar). In 2.5 per cent the origin was not found. In four there was a double infection in both lungs and abdomen. The predominant route was found to be aerogenous to the lungs, and most of the gastro-intestinal infections were of bovine origin, a source rapidly becoming extinct in other parts of the world. This series did not generally justify the idea of a primary localization of bacilli in other parts of the body and secondarily reaching the lung. In such cases the lung lesions were characteristically secondary.

There were, however, twenty-five cases in which no primary lesion was found, but in most of them the lymph nodes indicated that a lesion was in the immediate vicinity and was perhaps too small to be seen or was actually in a bronchiopulmonary node. In four, the lesions were along the trachea, indicating an infection downward from the cervix, or one that came directly through the trachea (Ranke), or one that passed through the lungs as a latent bacillus or in a phagocyte, to lodge in this particular group of lymph nodes. In any event, such nodes are extremely rare.

While the preceding observations are interesting, the greatest value from the standpoint of pathogenicity appears in the entirely new observations on the course of the infection within the lymph nodes of the lungs. Charts are presented in which the course of each infection is clearly diagramed.

From the right upper lymph nodes the predominant drainage is to the right superior tracheobronchial nodes and up the right tracheal and about a third into the right deep cervical nodes. The decreasing ages of the lesions were ascertained by a gradual lessening of encapsulation and caseation. About half of the right inferior tracheobronchial, left superior tracheobronchial and left tracheal nodes were involved, while a few infections reached the left inferior tracheobronchial and a few less descended to the abdominal nodes. The same general proportions prevailed for infections of the left upper lobe. In the lower lobes the involvement reached the inferior tracheobronchial nodes most and diffused upward and outward about in the ratio of the proximity of the nodes to the progressing infection. The abdominal infection frequently ascended into the mediastinal nodes.

The work secures classic status from its discussion of the typing of the tubercle bacilli in the pulmonary, abdominal and cervical lesions (with a repetition of Griffith's, Park's and others) on the various lesions of surgical tuberculosis. This bacteriologic correlation is the "keystone of the arch" that was lacking in earlier works. The typing was based on the various differences between the true human (eugonic) and true bovine (dysgonic) strains.

The chief means for differentiation were as follows: (1) the well known characteristic of the human type to form pigment on glycerinated serum medium; (2) the inability of the bovine type to grow on glycerinated medium; (3) the classic difference in the reaction in rabbits. All these factors and others were combined until it seems highly probable that the error was at most slight. It demonstrated clearly that only about 30 per cent of cultures were typical on isolation, while the others conformed to type only after one, two or three transfers on culture medium or after animal passage. This shows how great the variability of the tubercle bacillus is. In three certified human type strains there was practically no virulence for guinea-pigs. In the whole series there was only one mixed infection — a simultaneous human pulmonary and a bovine abdominal infection. One rabbit was thought to have been infected spontaneously with the bovine bacillus. There were only two bovine aerogenous pulmonary infections to be added to the half dozen already in the literature. Even in Glasgow, where the bovine infection is quite prevalent, the pulmonary route for bovine bacilli is rare. As to the bovine infections, they were nearly always in the gastro-intestinal tract (81.8 per cent of all the gastro-intestinal lesions and about 27 per cent of all dying of tuberculosis). Some were ulcerous, others were only glandular. Many were more or less benign in type.

The surgical tuberculosis consisted in a lower bovine incidence (64.3 per cent) than others obtained in Scotland (Mitchell, 88.9 per cent; Griffith, 71.4 per cent). The bone lesions were lower still, 34.6 per cent. In fact, the bovine lesions were chiefly in the gastro-intestinal canal, where milk furnished the infection.

Thirty-six specimens yielded no cultural results, and only 64.6 per cent (86.6 per cent human and 56.2 per cent bovine) of the antiformin treated specimens yielded cultures. It would seem that the percentage recovery in this type of material is rather low compared to the results of others. The author rightly recommends direct inoculation when possible. He suggests that some of the bacilli may be dead or have poor adaptability. When it is recalled that a generation ago (before cultures were being made) most bacilli in smears were considered dead, it seems that here again methods should be examined more closely before such a suggestion is made.

Finally, let it be said that this work has leveled a powerful indictment against the cattle inspection of this region of Scotland. Whether it is due to the cloudy atmosphere (permitting the survival of the bacilli) or to laxity remains for the future to reveal. In spite of the fact that "the Ayrshire herds are carefully inspected" and "that 80-90 per cent of the milk is pasteurized," there must be a great deal of contaminated and unpasteurized milk pooled with the other. The facts cannot be evaded.

Synopsis of Gynecology: Based on the Textbook, Diseases of Women. By Harry Sturgeon Crossen, M.D., F.A.C.S., Professor of Clinical Gynecology, Washington University Medical School, and Robert James Crossen, M.D., Instructor in Clinical Gynecology and Obstetrics, Washington University School of Medicine. Fabrikoid. Price, $2.75. Pp. 227, with 110 illustrations. St. Louis: C. V. Mosby Company, 1932.

This synopsis is offered primarily for the use of medical students who intend to enter some field of medicine unrelated to gynecology. The content is taken from the textbook "Diseases of Women," by the same authors. The subject matter of approximately 1,200 pages has been condensed into 225 pages. The actual word content is something more than this ratio, as a much smaller type has been employed. The condensation has been well done but obviously at the sacrifice of much that is pertinent and valuable to the student who is acquiring a perspective in medicine. There is a place for quiz compends, but for the medical student who should obtain an insight into the part that gynecology occupies in the field of medicine this synopsis is quite inadequate. The reasoning, the deductions, the debatable issues necessarily omitted in this synopsis are included in all the standard textbooks on this subject and should be brought to the attention of every medical student during the period he is studying gynecology.

Roslinne jittya ta nervova sistema. Za redaktseyu zasl. Prof. A. I. Heymanovicha. Pratsi ukrainskogo derjavnogo psikho nevrologichnogo institutu. Tom XX. [Vegetative Life and the Nervous System. Edited by Prof. A. I. Heymanovich. Transactions of the Ukrainian Psychoneurologic State Institute. Volume XX.] Paper. Price, 3 Karbovanetz 40 Kopeks. Pp. 200. Charkov: Dvoy medichne vidavnitstvo, 1932.

This volume contains twenty-three contributions dealing with some clinical, physiologic and pathologic problems pertaining to the sympathetic nervous system. Some articles deal with such subjects as "syndrome of crocodile tears," "auriculotemporal syndrome and innervation of the sudoriferous glands of the face," "mutual relationship between the liver and the brain," and "atypical migraine." Some contributions could be recognized as having appeared before in German periodicals, which, however, are not referred to by name. This is altogether unfortunate, as the volume is published in a Ukranian language that only remotely resembles Russian. It is quite familiar to the Ukrainians of the former Austrian empire, and contributions published in such a rare tongue cannot be popular because of a limited scope of readers. The paper, printing and pictures are poor.

A Community Medical Service Organized Under Industrial Auspices in Roanoke Rapids, North Carolina. By I. S. Falk, Ph.D., Don M. Griswold, M.D., Dr.P.H., and Hazel I. Spicer. With Reports on Certain Phases of the Organization. By David Riesman, M.D., Sc.D., and George P. Muller, M.D. Publications of the Committee on the Costs of Medical Care, No. 20. Paper. Price, 90 cents. Pp. 105. Chicago: University of Chicago Press, 1932.

This is a report of the plan by which hospital and medical services are supplied to 4,919 mill employees who paid 25 cents weekly, an annual total of $3,708, the mill corporations paying the salaries of physicians and nurses, fixed charges and other expenses to the extent of $56,485, while the non-mill population pays $53,611 for individual treatment from the system, which also receives $4,732 from the Duke Endowment and the county commissioners for the care of the indigent. It is claimed that the medical care received by the mill families is generally of high grade and more adequate at less cost than that received by the non-mill population, while the average net income of the physicians is greater than the average in the United States. The average weekly wage of mill employees is $17.50 and for families $24.50, while the average for non-mill families is $27.16. When the contributions of the corporations to the medical service are included as wages-in-kind, the average annual income of a mill family is $1,320 and of a non-mill family $1,412, which would seem to indicate that the employers saved $92 a year per employee through the scheme. The report notices that, owing to the dependence of the plan on absentee owners, "The medical organization lives from hand to mouth and its operation is dependent upon current income from the mills and employees." A final comment notes that the present depression has led to a reduction of physicians' salaries 10 per cent and the number of nurses from three to one, and the employees have voted to double their contributions, the additional 25 cents weekly to be applied to physicians' salaries.

Wetter und Krankheiten vom Standpunkte des praktischen Arztes. Von Oberstadtarzt Dr. Viktor Baar. Boards. Pp. 171, with 96 monthly weather tables. Vienna: Verlag "Ars Medici," 1932.

This is a unique attempt to chronicle for a term of years (1919-1926) the weather and the chief forms of illness and death in Vienna. While many of the facts recorded are interesting and perhaps suggestive, it does not seem possible to draw clear-cut conclusions from the complicated mass of data, in which dust, heat and cold, sunshine, direction of the wind and phases of the moon all play their part. Few readers will be able to extract from this material information of value enough to justify the expenditure of time in assembling it.

A Syllabus of Lectures on Gynecology for Nurses. Prepared by a Committee Appointed by The American Gynecological Society. Paper. Price, 50 cents. Pp. 41. New York: The Committee, 1932.

This syllabus is a companion to the syllabus on obstetrics for nurses published two years ago under the auspices of the American Gynecological Society. It is an excellent composite of the subject matter deemed essential in the instruction and training of the undergraduate nurse in the field of gynecology. Nine lectures are presented in thirty-five pages of text. They cover anatomy, physiology, disorders of menstruation, inflammatory diseases, tumors, obstetric injuries and malpositions of the uterus, special gynecologic disorders, gynecologic nursing, and gynecologic operations. The committee has pointed out in the foreword that this syllabus is offered as a convenient outline for the instructor, while almost a textbook for the pupil nurse, and can be modified to suit any local technic or point of view. The directness, simplicity and authority of this syllabus should lead to its general adoption in the training schools of the country.

Hospitals and Child Health: Hospitals and Dispensaries, Convalescent Care, Medical Social Service. Reports of the Subcommittees on Hospitals and Dispensaries, Clifford G. Grulee, M.D., Chairman; Convalescent Care, Adrian V. S. Lambert, M.D., Chairman; Medical Social Service, Ida M. Cannon, R.N., Chairman. White House Conference on Child Health and Protection. Cloth. Price, $2.50. Pp. 279. New York & London: Century Company, 1932.

This book presents the conclusions of three subcommittees of the White House Conference on Child Health and Protection based on a study and investigation of the whole problem of the relationship of the hospital toward the health and welfare of children. The first part of the book presents the report of the Subcommittee on Hospitals and Dispensaries, of which Clifford G. Grulee, M.D., of the Rush Medical College of the University of Chicago, is chairman. This part surveys the situation in children's and orthopedic hospitals, dispensaries and posture clinics. The second part presents the report of the Subcommittee on Convalescent Care, of which Adrian V. S. Lambert, M.D., of the Welfare Council of New York City, is chairman. This part considers the situation in convalescent homes and offers practical suggestions for improving the service and increasing the number making use of convalescent care. The third section, occupying more than half of the book, is the work of the Subcommittee on Medical Social Service, of which Ida M. Cannon, R.N., of the Massachusetts General Hospital, is chairman. It describes in detail conditions obtaining in rural and urban communities and recommends the extension of social service in these fields.

Medicolegal

Compensability of Traumatic Hysterical Paralysis

(Rystedt v. Minneapolis Moline Power Implement Co. (Minn.), 242 N. W. 623)

The employee in this case was engaged in moving bundles of steel rods, about 16 feet long, by means of a crane. In order to lift and move them a chain was passed around the center of the bundle of rods to be moved. In one particular bundle, weighing approximately 1,500 pounds, the chain was not centered accurately, so the employee placed his right shoulder under the heavier end to hold up the rods as the bundle was moving. While in that position, the chain slipped or slacked so that a sudden jar of the bundle subjected the employee's shoulder to a great strain under the excessive weight. The pain was so severe that he could not go on with his work for about fifteen minutes. He then worked the rest of that day and until the afternoon of the next day, when he became so sick as to need medical attention. As a result of the accident, the employee claimed an inability to use his right arm. The industrial commission awarded him compensation and the employer carried the case to the Supreme Court of Minnesota.

The employee's wife testified that the shoulder was swollen when the employee arrived home the day of the accident, and that there was a red spot and some bluish spots on it when she applied cold water packs. Examinations made by physicians, several days after the accident, disclosed no organic lesion or objective evidence of injury. While an expert in neurology, said the court, testifying for the employer, conceded the existence of hysterical paralysis, he was of the opinion that it did not originate from the accident. Other medical experts, called by the employer, likewise attributed the disability to causes other than the accident. None of them claimed that the employee was malingering. Medical experts testifying for the employee, on the other hand, testified that he was afflicted with hysterical paralysis of the right arm and shoulder, which rendered him unable to work, and that such paralysis resulted from the accident. At the time of the trial no organic disability could be found traceable to the accident; the inability to use the arm was functional. Either the will power or the nerves failed to move the muscles of the right shoulder and arm, and medical authority seems to agree that hysterical paralysis as effectively prevents the use of members or parts of the body as true paralysis does. The evidence in the case was to the effect that a slight accidental injury is more likely to cause hysterical paralysis than a serious injury.

From the evidence, said the court, it must be conceded that the industrial commission could properly find that the accidental injury proximately caused the hysterical paralysis. The court then, in holding the disability compensable, cited *Welchlin* v. *Fairmont Railway Motors*, 180 Minn. 411, 230 N. W. 897, in which case, after calling attention to the fact that at common law damages could be recovered for traumatic neurosis caused by the negligent act of another, the Supreme Court of Minnesota said:

> Under the Compensation Act the injured workman does not recover damages as such for an injury, but receives a stated compensation fixed by the statute as compensation for disability; and he may have compensation for neurosis if it is a proximate result of his injury and results in disability.

Malpractice: Removal of Soft Palate, Uvula, and Pillars in Course of Tonsillectomy.—The defendant was sued for malpractice. It was claimed that in performing a tonsillectomy he removed the uvula, the posterior and anterior pillars on the right side of the plaintiff's throat and a portion of her soft palate. The defendant, while denying that he had removed any portion of the soft palate, admitted that the uvula and the pillars had been removed because of the diseased condition of the plaintiff's throat. Several physicians testified for the defendant that if the plaintiff's throat was diseased, as claimed by the defendant, it was necessary in performing the operation to remove the uvula and the pillars but that it was bad surgery to remove them if the throat was normal. These witnesses had not examined the plaintiff's throat prior to the operation. The plaintiff's family physician who referred the case to the defendant, and another physician who had been called in consultation, both testified that they had examined the plaintiff's throat prior to the operation and had found it normal. The family physician further testified that it was not necessary to remove the parts referred to and that an ordinarily skilful surgeon would not have done so. This evidence, said the Supreme Court of Oklahoma, is sufficient to sustain the finding of the jury that the defendant was guilty of negligence in performing the tonsillectomy. It was not error for the trial court to permit the plaintiff and several nurses to testify that the uvula, pillars, and a part of the soft palate had been removed. They had testified that they knew the location of the parts removed and what they were, and that any person examining the plaintiff's throat could readily see that they had been removed. The injury complained of, said the court, is objective in nature and a lay witness may testify with respect to the matter.—*Govan v. McCord (Okla.), 11 P. (2d) 141.*

Evidence: Opinion of Expert Based on Testimony.—The appellant contested the probate of a will, contending that the testator was insane at the time of its execution. At the trial two psychiatrists were called by the proponents of the will. These witnesses were present during the entire trial and heard all the evidence produced by both parties. Over the appellant's objection, they were permitted to give their opinions, based solely on such evidence, as to the testator's sanity at the time the will was executed. The action of the trial court in this respect was erroneous, the appellant complained. Probably the usual method in eliciting testimony from an expert witness, said the Supreme Court of Colorado, is to have him testify in answer to hypothetical questions which assume that all, or certain parts, of the testimony are true. But the authorities seem to permit the procedure followed here. In Wigmore on Evidence (ed. 2), p. 1095, section 686, it is said:

> Where an expert witness has not had personal observation of matters of fact in the case in hand, but has listened to or read any or all of the testimony or depositions to such matter of fact, he may be asked, by the party calling him, to state his conclusion, without specifying in the question the data forming the basis of the conclusion.

—*Callahan v. Feldman; In re Callahan's Estate (Colo.), 11 P. (2d) 217.*

Dentists: Delegation of Professional Duties.—The plaintiff in this case, Sproul, sued the defendant, a dentist, for the return of fees paid for a set of false teeth that he contended did not fit him. He further contended that his contract with the dentist had a personal element in it that could not be assigned, such as has a contract with a surgeon engaged to perform an operation, but that the dentist did assign a part of the duties involved in making the plate. A dentist, says the Supreme Court of Kansas, does not impliedly warrant to his patient that he himself will do all the work involved in the construction of a set of false teeth. The court will take judicial notice of a common practice in the dental profession for a dentist to take the impression of a patient's jaw and do all things that have to do with the fitting of teeth in the mouth, and then to send the plate to what is known as a mechanical dentist for vulcanizing and polishing. Furthermore, continued the court, the analogy presented by the plaintiff would be more nearly correct if the dentist were compared with one who prescribes glasses for a patient and then sends the prescription to an optical company, equipped with the machinery to grind the lenses according to the prescription. The fact that a dentist constructs one set of teeth that does not fit the patient and then constructs a second set which does not fit on the first trial in the patient's mouth does not entitle the patient to sue for a return of the fee paid to the dentist for constructing the teeth. The patient must accord the dentist a reasonable opportunity to fit him. What constitutes a reasonable opportunity must depend on the facts and circumstances of each individual case and is for the jury to determine. Sometimes a defect may be corrected by a little filing away of a place where the plate rubbed the gums. Sometimes the teeth can be filed and made to fit. Sometimes plates can be filled up a little in some place so that they will fit. Any of these things might be done in a few minutes. It would be a harsh rule that would deprive a dentist of pay for his services on account of defects which could be remedied by a few moments' work. The judgment of the trial court for the dentist was affirmed.—*Sproul v. Russell (Kan.), 11 P. (2d) 978.*

Society Proceedings

COMING MEETINGS

American College of Physicians, Montreal, February 6-10. Mr. E. R. Loveland, 133-135 South 36th Street, Philadelphia, Executive Secretary.

Annual Congress on Medical Education, Medical Licensure and Hospitals, Chicago, February 13-14. Dr. W. D. Cutter, Council on Medical Education and Hospitals, 535 North Dearborn St., Chicago, Secretary.

Pacific Coast Surgical Association, Del Monte, Calif., February 23-25. Dr. Edgar L. Gilcreest, 384 Post Street, San Francisco, Secretary.

Southeastern Surgical Congress, Atlanta, Ga., March 6-8. Dr. B. T. Beasley, 45 Edgewood Avenue, Atlanta, Secretary.

CENTRAL SOCIETY FOR CLINICAL RESEARCH

Fifth Annual Meeting, held in Chicago, Nov. 4, 1932

(Concluded from page 70)

Roentgenography of the Peripheral Arteries

DRS. EDGAR V. ALLEN and JOHN D. CAMP, Rochester, Minn.: The arteries of the extremities can be visualized by injection of Thorotrast (25 per cent thorium dioxide solution) into the lumens of the brachial and femoral arteries. The injections are painless when carried out under local anesthesia; it is not necessary to expose the arteries. Ten cubic centimeters is injected into the brachial and 25 cc. into the femoral arteries. The method is of value in demonstrating patency or occlusion of arteries which cannot be determined by clinical examination. Occlusion of the arteries above the points of injection allows filling of the arterial parts as desired. Pictures obtained in this manner are extremely valuable in studying morphologic changes in the lumens of the vessels. Occlusive arterial disease of any extent can be recognized easily if due attention is given to interpretation of the films.

DISCUSSION

DR. BAYARD T. HORTON, Rochester, Minn.: This is a very interesting piece of work which has been presented. This type of work is still in its infancy and will probably open up new fields for clinical investigation. It can be used to give additional information about vascular diseases which cannot at present be obtained by other methods. It could certainly be used in determining the situation of abnormal arteriovenous communications in extremities. This is particularly true with reference to acquired arteriovenous fistulas, which frequently result from stab wounds or gunshot wounds. The surgeon is interested in knowing whether the abnormal communications involve the deep or the superficial vessels, and accurate information regarding these points can be obtained by this method of study. This alone is of extreme importance from the standpoint of surgical intervention. It is also applicable to the study of intracranial vascular lesions and probably will be of use in the study of intrathoracic and abdominal vascular conditions.

DR. E. V. ALLEN, Rochester, Minn.: We realize that it is difficult to interpret roentgenologic observations in such a study as this because of relative inexperience. We are learning now what a normal artery looks like and by careful checking we are beginning to find out what all these shadows mean.

The Electrocardiogram in Coronary Thrombosis

DRS. FRANK N. WILSON, PAUL S. BARKER, L. L. KLOSTERMEYER and A. G. MACLEOD, Ann Arbor, Mich.: Study of a group of cases of coronary thrombosis emphasizes the diagnostic value of a series of electrocardiograms. The progressive change in form of T, the occurrence of partial or complete block, paroxysmal ventricular tachycardia, and the sudden development of intraventricular block or of very small complexes are of diagnostic importance. In addition, characteristic and more lasting QRS changes often occur, not as yet fully described. These fall into two groups, the first characterized by small complexes and broad and conspicuous Q waves in lead I, the second by prominent Q waves in leads II and III.

Effect of Anoxemia on the Electrocardiogram of Normal Persons

DRS. L. N. KATZ and W. W. HAMBURGER, Chicago: A series of experiments were made on twenty normal individuals breathing an atmosphere the oxygen content of which was gradually diminished to 7 volumes per cent (without accumulation of carbon dioxide). Anoxemia decreased the height of the T wave and depressed the ST level. These changes resemble those reported during attacks of angina pectoris and so favor the view that ischemia causes the electrocardiographic changes in angina pectoris. In these normal persons, electrocardiographic changes as marked as those seen in anginal attacks occurred without evidence of pain. This indicates that the electrocardiographic changes and the pain may not be produced by the same process. It must be borne in mind that disease of the heart may alter its response to anoxemia and to pain-producing stimuli.

DISCUSSION ON THE ELECTROCARDIOGRAM

DR. HAROLD FEIL, Cleveland: The last statement of Drs. Katz and Hamburger is interesting because here there is ischemia without pain. I wonder whether cerebral ischemia can be playing a part in the lack of response to stimuli.

DR. S. M. WHITE, Minneapolis: I think that all who are interested in cardiology appreciate the character of the work that is coming from Dr. Wilson's laboratory. It is particularly significant that Dr. Wilson and his co-authors stress serial electrocardiographic tracings in coronary thrombosis. One of the difficulties encountered is that there are a number of other conditions in which the electrocardiographic changes of thrombosis may be simulated. It seems to me, however, that one of the most important steps in the progress of medicine has been a serial study of the electrocardiogram. Individuals whose tracings have been taken for the first time often give moderate deflections which may be said to be suggestions of coronary thrombosis and yet a serial study shows that they were not progressive changes and the final determination shows that the coronary was not the basis of the changes found. I should like to ask whether consideration has been given to the idea that these functional changes, which are added to those spoken of as definitely anatomic, can be due to functional changes in the vessels, such as spasm in the vessels, and whether this could play a part in the so-called functional changes of the myocardium.

DR. FRED M. SMITH, Iowa City: It is well to bear in mind that cardiac infarction may produce various alterations in the electrocardiogram. Some of these, particularly those pertaining to the T wave and the RT and ST segments, are more conspicuous than others. After all, it is not so much the character of the alteration as the succession of changes that is distinctive of acute myocardial damage. In this connection I should like to call attention to some work that is being done at the University of Iowa. Fowler and Rathe have found that the ligation of the third and fourth subdivisions of the coronary arteries of the dog invariably produces characteristic changes in the electrocardiogram. In some instances the lesion in the myocardium was so small that it is doubtful whether it would have been found at necropsy had not the ligature directed attention to the location. These observations would indicate that the electrocardiogram is very sensitive to changes in the myocardium and it is believed that they may hold for man. We have already observed in a few cases clinical confirmation of these results. A patient was admitted to the University Hospital a few days ago with congestive failure and paroxysmal dyspnea. On the third night following admission he experienced for the first time a peculiar substernal pressure. There were no apparent changes in the physical signs, yet in the subsequent electrocardiograms, taken at daily intervals, alterations were noted which we believe to be indicative of coronary occlusion.

DR. HARRY L. SMITH, Rochester, Minn.: In a group of cases in which the diagnosis has been coronary occlusion and the diagnosis has been verified at necropsy, the electrocardiogram has been negative. However, in these cases the infarctions were not multiple and the distribution of the coronary arteries was typical. I should like to ask the authors whether they have had such cases, and, if so, how they explain the negative electrocardiogram.

DR. WILLIAM B. KOUNTZ, St. Louis: There is a difference in the electrocardiogram between anoxemia and ischemia. The two things cannot be separated clinically but they can be experimentally. Anoxemia lowers and later inverts the T wave. Ischemia changes the ST interval primarily. I wonder whether the distinction between the electrocardiogram in patients under anoxemia and with angina pectoris is not concerned with the accumulation of end-products of metabolism in the heart in the latter case, whereas these products are washed out of the heart by the blood in anoxemia and do not reach a degree of concentration that will change the electrocardiogram to a considerable degree.

DR. R. G. PEARCE, Akron, Ohio: Physicians lately have gotten away from the lactic acid idea and the relationship of carbon dioxide in the theory of muscular contraction. This is a definite physiologic problem and Hill has given a good review of it in a recent issue of *Physiological Reviews*. The article throws some light on the subject.

DR. DON C. SUTTON, Chicago: Dr. Katz has called attention to the fact that marked anoxemia can occur without pain, and I feel that the pain of angina shows diminished flow of blood to the myocardium. However, I believe that anoxemia is too narrow a term.

DR. FRANK N. WILSON, Ann Arbor, Mich.: I should like to say a few words regarding the electrocardiographic diagnosis of myocardial infarction with particular reference to the RS-T segment. Many observers have described changes in this segment similar to those that occur in myocardial infarction in other conditions. In most cases, however, the changes have not been exactly the same as those seen in myocardial infarction, and one cannot feel certain that they were produced in the same way. In coronary thrombosis the RS-T displacement is almost always in opposite directions in leads II and III. This may depend on the location of the infarct, and an infarct that has an unusual location may give a different picture. Nevertheless, curves that show an RS-T displacement that has the same direction in all three leads cannot be considered altogether typical of coronary thrombosis. In the second place, the displacement of the RS-T segment that occurs in myocardial infarction is always or almost always followed by progressive and characteristic changes in the T deflection. Similar changes in T have been observed to follow RS-T displacement in man in no other condition except stab wounds of the heart. In pericarditis and in pneumonia, RS-T displacement has been observed, but in the recorded cases it has gradually disappeared without changes in T of the type seen in myocardial infarction. One cannot be sure, therefore, that it is similar in origin or in significance. Changes in the RS-T segment and in T are of more value in the diagnosis of myocardial infarction when they are accompanied by characteristic changes in the QRS deflections than when they occur alone. Regarding the absence of electrocardiographic changes in myocardial infarction, it sometimes happens that the changes are transient and the electrocardiographic examination is not made at the proper time to detect them. It may be that the location of the infarct is not such as to produce any changes, or that the infarct is too small to produce recognizable changes in the three standard leads. In some cases, changes in precordial or anterior-posterior leads have been recorded when there were no changes in the standard leads. The rapidity with which the infarct develops may be important; it is possible that infarcts that develop slowly may fail to modify the electrocardiogram.

DR. L. N. KATZ, Chicago: It has been our experience that the electrocardiogram of recent coronary occlusion does not always fit into the T_1, T_3 types of curves. Dr. Bohning and I are publishing a series of such curves. In addition we are describing a tall, upright T wave, the inverse image of the ordinary negative coronary T wave, which we think is equally characteristic. We are calling this the positive coronary T wave. Dr. Kissin and I have made a study of lead IV (Wolferth and Wood) in twenty-five normal subjects, eleven cases of recent coronary occlusion, and eighty-six other abnormal heart cases. Characteristic changes were found in one or more of the four leads in each one of the eleven cases of coronary occlusion. Six of these cases which showed nothing unusual in the ordinary three leads had characteristic changes in lead IV. We therefore advocate the routine use of the fourth lead in all patients suspected of recent coronary occlusion. The nondevelopment of chest pain in these normal cases is not due to cerebral anoxemia. In the work of Rothschild and Kissin, and in some similar unreported work of our own, patients with angina pectoris, subjected to this test, had pain despite simultaneous development of signs of cerebral anoxemia. Furthermore, Dr. Kissin, working in our laboratory, has shown that pain will develop in an exercising muscle during generalized anoxemia without local stasis and will disappear with the elimination of this generalized anoxemia. The pain described by Lewis during muscular ischemia therefore appears to be due to the lack of oxygen and not to local stasis. So far as I can see there is no evidence that ischemia does anything in the production of electrocardiographic changes or pain that anoxemia by itself cannot do. In our experiments we were careful to see that no carbon dioxide accumulated, so that we were studying only the effects of decreasing concentrations of oxygen. It is interesting that while anoxemia seems to be the background of both the electrocardiographic changes and pain, the processes involved in the development of these two changes apparently are different, so that in our normal subjects the electrocardiographic changes were not accompanied by pain.

The Blood in Essential Hypertension

DR. G. E. WAKERLIN, Louisville, Ky.: The action of the blood serum on the tone of arterial segments from beef mesenterics was studied in a series of thirty patients having essential hypertension and in a series of fifteen patients having normal blood pressures. No significant differences were found in the vasoconstricting properties of the arterial rings in the serums of the two groups. The results suggest that there is no peripherally acting pressor substance in the blood of patients with essential hypertension. Some evidence was obtained for the existence of a spontaneous rhythmic motor activity resident in arterial musculature deprived of its extrinsic innervation.

DISCUSSION

DR. LOUIS LEITER, Chicago: I should like to ask Dr. Wakerlin whether he considered the possibility of the presence of pressor substances in ultrafiltrates of the serum or heparinized plasma; also whether the use of other arteries than the mesenteric, e. g., the vertebral, might not give different results with hypertensive serums.

DR. E. V. ALLEN, Rochester, Minn.: In order to demonstrate absence of substances responsible for hypertension, it would be necessary to show that there are no pressor substances acting on the terminal arterioles.

DR. G. E. WAKERLIN, Louisville, Ky.: There are certain definite limitations inherent in the method employed. For example, the process of clotting may have destroyed or altered the pressor substance originally present. The use of human serums and beef arterial rings introduced an unknown species difference factor. The epinephrine-like substances in the serums may have overshadowed the effect of the pressor substance unless it was present in at least moderate quantities or sensitized the vasoconstrictor nerve endings to the epinephrine-like bodies. Consequently, I feel that the results, at best, represent a small link in the chain of evidence against the presence of a pressor substance in the blood in essential hypertension. As is so often the case with negative results, the observations do not in themselves preclude the presence of such a pressor substance. If the results had been positive, obviously they would have been significant. It would be valuable to use an ultrafiltrate of serum or heparinized plasma instead of serum, for similar studies. The use of carotid or vertebral artery segments may also be desirable. A tertiary branch of the superior mesenteric artery was employed because this vessel is known to contain relatively more smooth muscle and less elastic tissue than the carotid or vertebral arteries. The superior mesenteric branch therefore would appear to be more analogous to the arterioles. I have no other suggestions to make as to the possible etiology of essential hypertension. I am fully aware of the obvious difference between an arterial segment in vitro and arterioles in vivo. This constitutes another limitation inherent in the method. I did not study any serums from patients with renal hypertension but there have been several reports in the past few years, of results by methods other than the one which I used, indicating that there may be pressor substances in the blood stream of patients with renal hypertension.

Roentgenologic Studies of the Gastro-Intestinal Tract in Early Infancy: Preliminary Report

DRS. T. D. CUNNINGHAM, JOHN S. BOUSLOG and JAMES B. WALTON, Denver: The studies of the gastro-intestinal tract in early infancy included observations showing the position, emptying time, absence of the visible peristalsis of the stomach, the shape of the stomach and position of the duodenum, the few haustra and the emptying time of the colon.

DISCUSSION

DR. CECIL STRIKER, Cincinnati: I should like to ask whether the authors anticipate any bad effects from these x-ray exposures.

DR. WALTER L. PALMER, Chicago: I should like to ask how much variability there was in the emptying time of the stomach in infants of a given age. Was it fairly constant or not?

DR. T. D. CUNNINGHAM, Denver: We anticipate no trouble from the exposures to the x-rays. So far we have seen no bad effects and the work has been going on for five years. In regard to Dr. Palmer's question, the emptying time is our next problem. I might say that, at 3 months, in general the emptying time has been four hours but we are not prepared to say that definitely.

Behavior of Gastric Acidities During Ulcer Treatment

DR. CLARENCE F. G. BROWN, DR. RICHARD H. YOUNG, STUART P. CROMER and A. DONALD HAUG, Chicago: Conclusions concerning acid behavior in stomachs under treatment for peptic ulcer have been based on short observation periods. The question of what happened to the hyperacidity during the healing process and for a long time thereafter appealed to us. For the past five years, weekly test meals have been done on patients during and after several forms of ulcer therapy. Nearly 5,000 gastric analyses have been studied during the last two years. This material was obtained from 10,500 visits to the Gastro-Intestinal Clinic at St. Luke's Hospital. We feel that we have insufficient data to justify, as yet, more than general conclusions: 1. Gastric acidities modify as pylorospasm moderates. This occurs if the threshold of visceral reflexes is lowered, if the exciting cause of these reflexes is quieted, or if the ulcer subsides. 2. Some persons never remain within so-called normal limits, even after the ulcer is clinically improved or termed "healed." 3. It is possible for an ulcer, in an occasional case, to subside either on alkalis or on mucin when the weekly acid levels are increasing. 4. It is difficult to change further the average acid levels, over a long period of time, with any treatment except mucin management. In the series of mucin treated patients the acidity levels eventually came down and stayed down, although they sometimes increased during the early part of the management. Many of the patients on alkalis and hourly feedings had progressively increasing acid levels without eventual moderation. More definite data will be presented later. The eradication of worry and fatigue, and the use of "antispasmodic" drugs seem almost as important as neutralizing feedings, powders, mucin or the elimination of infections. In other words, the entire patient, the entire alimentary canal, as well as the ulcer itself must be treated properly to obtain good results. All these factors affect gastric acidities.

DISCUSSION

DR. GEORGE B. EUSTERMAN, Rochester, Minn.: Several thousands of these patients have been treated on the basis of this theory. There are many schools that hold that the acid factor is an important factor. My experience has been that the acid factor cannot be ignored in the pathogenesis of peptic ulcer, particularly in duodenal ulcer, which is much more frequent. Much better criteria of acid levels in patients of different sex and age are now available. It has also been found in the treatment of a large series of cases on the basis of the Sippy idea that there are variable responses. There is a group in which a good response is obtained. Then there is a second group in which the neutralization method gives no help. The more that some of these patients are treated and the more frequently that they are fed, the greater is the acid stimulus. This subject is of great importance. The mucin method of treatment is a help, but the mucin therapy has the disadvantage of being very distasteful to the patient; the patients tire of it. In some patients it has the effect of increasing acidity, and in certain instances it has been found to be dangerous, especially in cases with chronic degenerative renal and hepatic lesions. We have not found that any of the newer preparations of mucin avoid these possibilities. I think that all in all the experiences of Dr. Brown and his associates have been almost what every one's experiences have been. Further study should be carried out. I believe it has been brought out that in a patient with gastric carcinoma the acid has not been seen to diminish as carcinoma progresses. Harper has recently done some work on animals, which is to be reported soon. He proves the importance of the acid factor in the pathogenesis of ulcers, its increase during formation of the ulcer and its decrease during the healing stage, but I must confess that we have not yet found the parallel in human ulcer.

DR. FRED M. SMITH, Iowa City: During the past three years I have been greatly interested in the altered physiology of the stomach associated with peptic ulcer. Patients have been studied during periods of distress and at varying intervals during treatment. During periods of distress there is invariably an increase in the tone and peristaltic activity of the stomach and an active secretion of hydrochloric acid. In general, it would seem that these features are intimately associated. However, I have frequently observed a continuation of the increased tone and peristaltic activity after the free acid was neutralized by alkalis. After the patient has been in the hospital a few days and is free from distress there is often considerable regurgitation of bile, which would appear to be an important factor in the neutralization of the excess acid.

DR. SIDNEY PORTIS, Chicago: I should like to ask Dr. Brown and his associates whether they have any conclusions to show that there is a decreased peptic activity while mucin therapy is being carried on. It would seem to me from some of the experiments that it is a question of peptic activity and not the presence of hydrochloric acid. I wonder whether it could not be tested by some simple method to see if there is a diminution of activity. It is interesting to note the wave of thought in regard to the etiology of ulcer. There were many who believed that hydrochloric acid was a factor. Lately has come the mucin therapy, which shows that healing goes on in the presence of acid.

DR. CLARENCE F. G. BROWN, Chicago: In answer to Dr. Eusterman, we feel that if there is an acid factor in the pathogenesis of ulcer, an attempt must be made to find some method of treatment that will end up with a lower gastric acidity, week after week and month after month. We have demonstrated that acid levels eventually moderate on mucin therapy, while they may rise with alkalis. Perhaps if Dr. Eusterman is right these mucin cases will not recur as many times as we see them recur now on alkalis. We recognize the taste factor and have had only a slight difficulty in having patients take the mucin. The product is being greatly improved in this respect. We have seen no manifestations that could be called "dangerous." I am aware of Hurst's statements that in Barford's work the acid remained at a constant point, or higher, after treatment. This work consisted of a few observations on a few patients and is insufficient for a conclusion. Data must be obtained at weekly intervals for months. (Our patients average over nine months; none are considered under four months.) We failed to find evidence of any similar work in the literature. In regard to Dr. Smith's remarks, I agree that the acidity does not parallel distress. The explanation of this is not clear. Whether there is a change in the visceral sensory threshold of which we know nothing is a question. We believe that the element of spasm is an important factor in distress and has a bearing on the acidities. So far as bile is concerned, every time we find bile the acid is down. This forces us to regard regurgitation as a part of the mechanism of acid control. The intrinsic gastric acidity regulatory factors are now being studied and evaluated. Dr. Portis brought up the subject of the etiology of ulcer, which I do not feel is pertinent to discuss in this paper. I think that an open mind must be kept until more is learned from the literature on experimental and clinical work before a decision on this is made. We have not done sufficient Metz tube experiments to report. The point of this paper was to stress the behavior of acid levels over a period of months and in some cases of years.

Physiology of the Colon: II. The Effects of Cathartics on and the Motor Activity of the Colon

DRS. J. ARNOLD BARGEN and L. M. LARSON, Rochester, Minn.: The effects of many cathartics on the isolated colon loop of the dog have been studied. There is a direct relation between mucus secretion and the effectiveness of a cathartic. The secretory and motor activity of the isolated colon can be recorded accurately by observation of the loop with the naked eye and by kymographic tracings. Significant data on colonic movements have been obtained.

DISCUSSION

DR. GEORGE B. EUSTERMAN, Rochester, Minn.: I should like to ask whether any of this work throws any light on our clinical problems. Every few days we see a patient who has developed a paralytic ileus. I should like to ask if this work on the colon has thrown any light on the more successful therapeusis of this condition.

DR. WALTER L. PALMER, Chicago: I should like to ask whether the authors have made any observations on the effect of cathartics given by mouth.

DR. J. ARNOLD BARGEN, Rochester, Minn.: In answer to Dr. Palmer's question I will say that all the cathartics were given by mouth. The effect was studied on the isolated loop of colon. I am not prepared to answer Dr. Eusterman's question.

Cholecystography: Its Diagnostic Value

DRS. WALTER L. PALMER and A. N. FERGUSON, Chicago: Gallbladder dye was given intravenously to 2,069 patients, according to the technic described by Case in 1929. Most of these patients had gastro-intestinal complaints, but the majority had no clinical evidence of biliary tract disease. Results were divided into three groups. In group 1, normal visualization with no stones was reported in 1,398, or about two thirds of the total. Such a report was found to represent a normal gallbladder in at least 98 per cent of the patients, judging from our collective clinical and operative data. In group 2, stones were demonstrated in 191 patients with various concentrations of the dye and different types of stones. Fifty-one patients were operated on and stones were found in 50, an accuracy approaching 100 per cent. Group 3 included those showing impaired function of the gallbladder with no x-ray evidence of stones. Nonvisualization was reported in 310 patients. Eighty-nine were operated on and 81 had pathologic evidence of gallbladder disease, an accuracy of 91 per cent. In the 221 not operated on, a clinical diagnosis of gallbladder disease was made in 102, an apparent accuracy of 46 per cent for the dye test. A faint visualization was reported in 170 patients. Thirteen were operated on and 9 had pathologic evidence of gallbladder disease, an accuracy of 70 per cent. One hundred and twenty-four were not operated on, but a clinical diagnosis of gallbladder disease was made in 33, or 27 per cent. Study of all patients in whom stones were found at operation showed that the preoperative cholesystographic report was "nonvisualization with no evidence of stones" in approximately 60 per cent of the cases, and that stones had been demonstrated in 40 per cent.

DISCUSSION

DR. GEORGE B. EUSTERMAN, Rochester, Minn.: There is no procedure that has given rise to more wrong diagnoses than the roentgenologic. The number of men throughout the country who will operate purely on roentgen diagnosis is amazing. I want to commend the men who bring up this study. I hope it has wide publicity. I think all the conclusions mentioned are quite identical to conclusions I made four or five years ago. I must emphasize the fact that x-ray men, laboratory men and clinicians must work together. Cholecystographic diagnosis is extremely valuable in competent hands. While one may be criticized for using the oral method of administration of the dye, I see no reason for changing to the intravenous method. The oral method is extremely accurate when positive observations agree with the clinical evidence. If the first test is not positive, it should be repeated if cholecystic disease is suspected. I have also found that in patients with early low grade jaundice there may be use for the cholecystographic procedure, as evidence may be found of stones or an enlarged gallbladder, especially the latter in cases of obstructive jaundice due to malignant processes involving the terminal biie duct.

DR. W. H. COLE, St. Louis: There are many difficulties which arise when an attempt is made to express diagnostic accuracy of cholecystic disease in percentages. One of these difficulties is encountered when one attempts to classify gallbladders as normal or pathologic as seen in the operating room through a laparotomy incision. In several instances the gallbladder appeared normal to the naked eye and even to palpation but contained one or more tiny stones in the fundus or cystic duct. It is also possible that there are functional derangements which are not manifested by gross pathologic changes. I agree that absence of shadow, and the presence of negative or positive shadows in the cholecystogram, are the most important points in the diagnosis of cholecystic disease.

DR. A. N. FERGUSON, Chicago: We are now using the oral method of administration of the dye. Indications are that it is sufficiently accurate for clinical use. We do not consider jaundice a contraindication to cholecystography unless it is very complete.

A Study of the Etiologic Relationship Between Pellagra and Pernicious Anemia

DRS. TOM D. SPIES, WARREN PAYNE and M. A. BLANKENHORN, Cleveland: Two patients with classic pellagra were given a diet free of vitamin G. One hundred and twenty-five cc. of gastric juice was obtained daily for ten days from each pellagrin. Each daily specimen of gastric juice was incubated at 37 C. for two hours with 200 Gm. of lean beef. Such mixtures were then given to each of two patients with classic pernicious anemia. Both showed characteristic remissions.

Effects of Drugs on Cardiac Standstill

DR. M. H. NATHANSON, Minneapolis: Sudden cardiac standstill is usually due to a temporary absence of an impulse-initiating mechanism within the heart. Various drugs have been suggested for the purpose of increasing the impulse-initiating property of the heart muscle. From observations on experimental animals and from clinical results there has been no general agreement as to the efficiency of various drugs in the prevention and treatment of cardiac standstill of this type. In the present study a method was utilized which permits a direct and objective study of the effect of drugs on the rhythmic property of the human heart muscle. In many human subjects it is possible to produce a prolonged cardiac standstill by pressure over the carotid sinus on the right side of the neck. During the period of carotid sinus stimulation the heart is deprived of its normal pacemaker and new centers of impulse initiation do not appear in most cases. If a drug abolishes the cardiac standstill by inducing an ectopic rhythm, it would be reasonable to conclude that this drug increases the rhythmic property of the heart muscle.

After a period of control observations which usually showed a remarkable consistency in the response to carotid sinus pressure, the effect of various drugs was observed. All reactions were studied with the string galvanometer. The following drugs were used: epinephrine, ephedrine, barium chloride, calcium gluconate, caffeine, digitalis, metrazol, coramine and thyroxine. Epinephrine in five subjects repeatedly and constantly abolished the cardiac arrest by inducing an idioventricular rhythm. It was possible to study accurately the time of onset and duration of the effect and also to demonstrate definitely a return of the epinephrine effect by massage of the site of injection. Ephedrine was ineffective in large doses orally, subcutaneously and intravenously. Barium chloride induced an ectopic ventricular rhythm in one case but was ineffective in another. Calcium gluconate, caffeine, metrazol, coramine and thyroxine to the point of hyperthyroidism had no effect. Digitalis prolonged the period of cardiac standstill.

Examination of the Spinal Fluid as an Aid in the Management of Abscess of the Brain

DR. HENRY W. WOLTMAN, Rochester, Minn.: Premature operation for abscess of the brain is unsatisfactory and often dangerous. Given encapsulation and a liquefied interior, the optimal time for intervention has arrived. This may be difficult to determine. To date, the history and quiescent optic disks are available as guides. Encapsulation does not always take place; these cases are from the beginning almost uniformly hopeless. Since it is customary to avoid spinal puncture because of the supposed danger of rupture, reports of examinations of spinal fluids are few. This danger seems to have been stressed unduly. Observations suggest that a small number of lymphocytes indicates better walling off and better resistance. Persistence or reappearance of neutrophils suggests that encapsulation is not progressing favorably or that the abscess may be near the ventricle. A predominance of neutrophils occurred only in cases in which operation was performed unnecessarily or which ended fatally.

Effect of Pregnancy Urine Extract and Follicular Hormone on Pituitary Hyperthyroidism

DR. PAUL STARR, Chicago: As has been shown by Loeb, by Aron and by Jansen, neutral extract of anterior pituitary gland when injected subcutaneously in dogs and guinea-pigs produces marked thyroid hyperplasia. Histologic preparations of this result will be shown. This produces (as has been shown by Seibert and Smith) a marked elevation of metabolic rate which has been measured in guinea-pigs in a closed circuit apparatus. Luteinization of the ovaries of guinea-pigs by pregnancy urine extracts given intraperitoneally does not prevent this pituitary action on the thyroid, although it does not produce it. Simultaneous administration of theelin seems to reduce it. This pituitary action provides one form of true endogenous hyperthyroidism for experimental study.

Vasomotor Response of Normal and Hypertensive Individuals to Thermal Stimulus (Cold)

DRS. JOHN F. BRIGGS and HARRY OERTING, St. Paul: Blood pressure determinations on 130 consecutive hospital admissions were studied in an attempt to determine the type of vasomotor response to a standard stimulus. A sensory stimulus was selected, consisting of the immersion of the hand in water of 4 C. for a period of three minutes. During this immersion, blood pressure readings were taken at intervals of one-half minute. In the series the results were correlated as to both age and sex and it was found that there was a specific response to the stimulus in both normal and hypertensive individuals. This response was found constant in both sexes and for each decade studied.

Changes in Surface Temperature in Vascular Diseases Affecting the Extremities During Sympathetic Ganglionectomy

DR. BAYARD T. HORTON, Rochester, Minn.: Continuous observations of surface temperature before and during sympathetic ganglionectomy were made on extremities of subjects with Raynaud's disease and Buerger's disease, by means of an electromotive thermometer. General anesthesia alone produced maximal vasodilatation in Raynaud's disease and Buerger's disease. Severance of the sympathetic nerves did not cause additional vasodilatation. In Raynaud's disease a prompt and uniform vasodilating response was observed in the peripheral vessels of all four extremities, but in Buerger's disease uniform response was absent. The uniformity of vasodilatation with anesthesia, and the graphic records obtained at the time of operation, were compared with the preoperative records obtained with other vasodilating agents.

Current Medical Literature

AMERICAN

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American Journal of Surgery, New York

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*The Well-Leg Countertraction Method: Details of Technic. R. Anderson, Seattle.—p. 36.
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*Postoperative Hernia: Consideration of Etiologic Factors. R. W. McNealy and M. E. Lichtenstein, Chicago.—p. 90.
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Blood Vessel Ligation Technic: Successive Steps in Tying "Granny" and "Square Knots." S. I. Weiner, Chicago.—p. 123.
Multiple Film Casette with Grating Localizer to Aid in More Precise Identification and Localization of Renal Calculi at Operation. W. W. Fray and W. T. Hill, Rochester, N. Y.—p. 124.
Metropolitan Hospital Sponge Holder. F. M. Al-Akl, New York.—p. 129.

The Well Leg Countertraction Method.—According to Anderson, fractures of the lower extremity and the pelvis can now be treated by a new method of skeletal traction which, though simpler in application, obtains better results. The principle depends on the utilization of the well leg alone for countertraction. The technical considerations are as follows: The well leg is held in adduction at the hip while applying the cast. The well foot is held at right angles with the foot in slight valgus (eversion or pronation of the foot). The sole of the well foot is padded with thin, soft, flexible felt and with a good amount of sheet wadding. A four-inch reinforcement of plaster should be smoothly applied over the entire plantar surface of the cast on the well foot; this should be molded accurately to fit the sole. Sufficiently large openings should be cut in the cast over the malleoli of both injured and uninjured ankles before the splint is incorporated. The cast should be cut out later over the posterolateral aspect of the head or heads of the fibulae. Pain or trouble with the well leg is usually attributed to careless application of the cast. Continued complaint demands a change of cast. Pain in the region of the well hip is usually indicative of too rapid or too much traction. In most cases when the lever arm is drawn down at a right angle with the longitudinal axis of the leg, the requisite amount of traction has usually been exerted. Overtraction should be avoided, especially in fractures of the femoral neck, by checking with repeated roentgenograms. Overtraction is a frequent cause of nonunion.

Hip Operation.—Kleinberg states that the reconstruction arthroplasty operation is an outgrowth of the Whitman reconstruction procedure. The technic employed is that described by Whitman plus the use of a double layer of fascia lata to form a sort of bursa between the newly formed femoral head and the acetabulum. The fascia is secured to the femur and through drill holes in the base of the neck. It has so far been used for ununited fracture of the neck of the femur and osteo-arthritis of the hip for which the Whitman reconstruction operation is chiefly intended. It has, however, also been applied in two cases of ankylosis of the hip in which this operation has the advantage over an ordinary arthroplasty in that the trochanter was displaced downward, thus securing a fair range of abduction. The reconstruction arthroplasty, which combines the technic of the reconstruction operation and hip arthroplasty, is indicated when either of these procedures is necessary and is likely to prove more effective than either because of the additional technical features. The author reports seven cases in which operations have been performed, the patients varying in age from 6 to 75 years. There were three cases of ununited fracture of the hip, two cases of hypertrophic osteo-arthritis of the hip and two cases of ankylosis of the hip, one of two years' duration and one of twenty-four years' duration. The results, while not final because of the short time since the operation, are encouraging.

Chronic Arthritides.—In observing 332 patients with rheumatoid conditions, Bick found that the systolic blood pressure in osteo-arthritis is in most cases considerably above the normal for each age group. In rheumatoid arthritis it is definitely subnormal. In nonspecific infectious arthritis there is no deviation from normal variations. Gradual occlusion of the peripheral arteries is a characteristic observation in rheumatoid arthritis. In advanced cases this may lead to gangrene of the distal part of the extremities. Osteo-arthritis is an uncommon observation in obliterative vascular disease. Varicosities occur in a large proportion of patients suffering from osteo-arthritis (77 per cent). The latter, conversely, is frequently found in patients in whom the chief or only complaint is varicose veins. The histopathologic appearance of the articular and periarticular tissues is consistent with these clinical observations and is logically deducible. Rheumatoid arthritis and osteo-arthritis are further differentiated by their respective vascular changes into two distinct diseases, nonspecific infectious arthritis being left as a third, heterogeneous, group.

Uterine Malposition.—A method of operation that overcomes all the disadvantages and fulfils the cardinal requirements for uterine displacements is described by Sacher. It is indicated in any form of uterine displacement and prolapse except an acute inflammatory condition. The technic is as follows: The cause is removed. This may include a dilation and curettement, a cauterization of the cervix, repair of the pelvic floor, or the removal of part or all of one or more of the pelvic organs. The fundus of the uterus is lifted into position. Curved Kelly forceps are pushed from behind forward through the broad ligament close to the uterus under the tube and under the round and ovarian ligaments. A loop of the round ligament is brought back through the opening in the broad ligament. This is repeated on the opposite side. Vertical incisions are made through the peritoneum just medial to the openings in the broad ligaments or just below the level of attachment of the ovarian ligaments. Curved Kelly or mosquito forceps are pushed from one opening to the other between the serous (peritoneum) and muscular layers of the uterus, thus forming a canal. Chromic catgut number 2 is sutured through the loop of each round ligament and brought through the canal to the opposite side. Each round ligament is scarified. Traction is made on the catgut sutures and the round ligaments are pulled together in the center of the canal, where they are sutured together with chromic catgut number 2. The traction sutures are removed. Another suture is taken through each ligament on both sides just medial to the broad ligaments. The openings into the peritoneum are closed. The author believes that this method of operation has the following advan-

tages: 1. It elevates the uterine fundus. 2. It elevates the ovaries and fallopian tubes. 3. It keeps the uterus in the anterior position by a forward and downward pull of the round ligaments, the resistance of the encircling loop, and the intra-abdominal pressure which is exerted on its posterior surface. 4. The uterosacral ligaments assist the position by keeping the cervix back. 5. It is simply and easily performed. 6. There is no chance for adhesions and obstruction. 7. No recurrences have been observed. 8. It does not favor postoperative hernia. 9. It does not interfere with pregnancy.

Postoperative Hernia.—From their clinical and experimental observations, McNealy and Lichtenstein believe that postoperative herniations of the anterior abdominal wall are due to excessive tension on the suture line, malocclusion of the incised layers of the abdominal wall, perforation of the wall by fat or omental tags, infection of the fascias with subsequent sloughing, muscle injury or paralysis, or systemic conditions such as diabetes, tuberculosis, syphilis and occasionally localized carcinomatous infiltration. They conclude that the transversalis fascia and the transversus muscle play an important part in maintaining, when intact, the integrity of the anterior abdominal wall. Accurate approximation of like structures is conducive to firm union. The intelligent application of abdominal binders and adhesive tape to the abdomen following closure of an abdominal wound in a manner to relieve the tension on the suture line assists in securing firm union.

Phlegmonous Gastritis.—Watson reviews twelve reported cases and one of his own of phlegmonous gastritis and believes that the condition is not as rare as it was formerly thought to be. There are two forms of the disease, the diffuse and the circumscribed. The diffuse form is fatal; the circumscribed form, not necessarily. The diagnosis has never been made before operation or necropsy. He suggests, as additional aids to diagnosis, the abdominal puncture after the technic of Neuhoff and routine preoperative roentgenograms of the abdomen. Treatment must be surgical, the procedure elected depending on the type of the disease. For the localized type, gastric resection is done; for the diffuse type, surgery offers the paliative relief of a jejunostomy. The etiology is not clear, but in a large number of cases there is a preexistent gastric disease, often carcinoma or ulcer, which may provide for the easy entrance into the submucosa of the streptococcus, the organism usually isolated from the phlegmonous gastric wall. All cases should be reported in detail, so that with increased material at hand the symptoms and diagnosis may be more clearly understood and the treatment improved. The surgeon when confronted with an acute inflammatory lesion in the upper part of the abdomen should always consider the possibility of a gastric phlegmon.

Archives of Neurology and Psychiatry, Chicago

28: 757-968 (Oct.) 1932

Relation of Filtrable Viruses to Diseases of Nervous System. T. M. Rivers, New York.—p. 757.
*Pathogenesis of Changes in Cerebrospinal Fluid in Meningitis. F. Fremont-Smith, Boston.—p. 778.
Histologic Studies in Meningitis. G. B. Hassin, Chicago.—p. 789.
Inflammatory Disease of Central Nervous System: So-Called Nonsuppurative Encephalitis and Encephalomyelitis. J. H. Globus, New York.—p. 810.
*The Brain in Acute Rheumatic Fever: Nonsuppurative Meningo-Encephalitis Rheumatica. N. W. Winkelman, Philadelphia, and J. L. Eckel, Buffalo.—p. 844.
Sensory Cortical Area: Experimental Anatomic Investigation. E. C. Milch, New York.—p. 871.
*Are Physiologic Disturbances Related to Acute Psychotic Process in the Mentally Ill? A. W. Hackfield, Zurich, Switzerland.—p. 883.

Cerebrospinal Fluid in Meningitis.—According to Fremont-Smith, meningitis is an empyema of the ventriculo-subarachnoid space. The cerebrospinal fluid in meningitis has the composition of pus. The chief changes in the cerebrospinal fluid in meningitis are an increase in pressure, cells and protein and a decrease in sugar and chlorides. The most important causes for increase in pressure are dilatation of the intracranial blood vessels and mechanical obstruction by the exudate and inflammatory reaction of the cerebrospinal fluid pathways. Decrease in the osmotic pressure of the blood, increase in the osmotic pressure of the cerebrospinal fluid and edema of the brain also may operate as causes. The cellular exudate comes chiefly from the blood stream and, to a lesser extent, from the arachnoid cells. In meningitis, as in health, the chemical composition of the cerebrospinal fluid depends chiefly on the composition of the blood plasma, the cerebrospinal fluid tending to remain in osmotic equilibrium with the blood. The chief change in composition of the blood plasma in meningitis is a lowering of the chlorides, which is reflected by a parallel fall in cerebrospinal fluid chlorides. A similar fall in cerebrospinal fluid chlorides occurs whenever the plasma chlorides are decreased, notably in acute febrile diseases, such as pneumonia or scarlet fever. The decrease in plasma chlorides is the chief cause for the low cerebrospinal fluid chlorides in nearly all instances. A second factor influencing the composition of the cerebrospinal fluid in meningitis is the local breakdown of dextrose from bacterial and cellular action. This results in a lowering of the dextrose content of the cerebrospinal fluid, which may fall nearly to zero, and in an increase in acidity of the cerebrospinal fluid, chiefly due to an increase in lactic acid. This in turn results in a disturbance of the Donnan membrane equilibrium and tends to lower the chloride content of the cerebrospinal fluid, bringing it nearer to that of the blood. In addition, there is a partial breakdown of the impermeability to protein of the membranes separating the plasma from the cerebrospinal fluid. This allows protein to enter the cerebrospinal fluid, raising its protein content, which results in a lowering of the cerebrospinal fluid chlorides. As the protein content of the cerebrospinal fluid in meningitis is usually only moderately increased, so that when compared to plasma the cerebrospinal fluid remains relatively protein poor, the effect of this increased permeability on the chloride distribution is usually slight and often negligible. Occasionally, however, especially in the presence of subarachnoid block, the protein content becomes markedly increased. Under these circumstances there is also the opportunity for the greatest accumulation of lactic acid. The cerebrospinal fluid chloride level may then become appreciably closer to that of the plasma. Rarely this combined effect may be quantitatively greater in lowering the cerebrospinal fluid chlorides than the effect of the fall in plasma chlorides.

The Brain in Rheumatic Fever.—Winkelman and Eckel describe five cases of rheumatic infection with clinical histories and physical observations. From their observations and a review of the literature they are led to believe that acute rheumatic fever does not produce a specific change in the brain that can be recognized either grossly or microscopically. The changes that are present in the brains of patients who have shown neurologic and psychiatric symptoms during the course of acute rheumatic fever are similar in every way to the changes that occur in any other acute infection and toxemia. The rôle of edema of the brain in the production of symptoms of so-called cerebral rheumatism has probably been greatly underestimated. Unless relieved, a vicious circle may be initiated. The endarteritis of the small vessels, which has been found in every case, has probably two causations: purely mechanical, as the result of edema of the brain, and toxic irritation through the blood stream. Areas of destruction, or acellular areas, in the brain are found frequently in cases of acute rheumatic fever, as they are in other infections and toxemias, and may produce a permanent clinical picture if sufficiently numerous. The occurrence of endocarditis can completely change the picture in the brain. Here the effect of embolic phenomena must be kept in mind. Purpura of the brain is a possibility; it may give evidence of its occurrence by similar lesions on the skin.

Physiology and Psychoses.—A brief review of the literature revealed that functional derangements of various of the physiologic processes have been demonstrated repeatedly in patients suffering from an acute affective psychosis. The results of gastric analyses and blood sugar tolerance tests, made by Hackfield, on fifty-four patients, have further demonstrated the existence of such disturbances during the acute stage of the psychosis. Furthermore, he shows that with improvement or clearing up of the psychotic process these functional disturbances again approach a normal state, indicating that for any given patient these observations represented a pathologic state. Emotional states produced by immediate environmental stimuli, including the technic of the test, had no apparent effect on the results. These dysfunctions appeared rather stable, and together with the psychologic symptoms

probably represented the expression of the same underlying process. In speaking of improvement heretofore, the author has taken the psychologic disturbances into consideration, but paralleling these the physiologic disturbances also approach accepted normal standards. What usually happens in this type of patient is that he either improves slowly, rapidly recovers completely or passes over into a chronic state. From a psychiatric standpoint the clinical picture in the chronic cases then changes; hallucinations or delusions, or both, may persist or the patient deteriorates. When the patient presents this state of the psychosis, these physiologic disturbances can no longer be demonstrated.

California and Western Medicine, San Francisco

37: 217-288 (Oct.) 1932

*Renal Tuberculosis: Why Clinically Established Renal Tuberculosis Never Completely Heals. R. Day, Los Angeles.—p. 217.
Bacteriophage Method of Treatment of Infected Wounds. F. H. Albee, New York.—p. 221.
Cancer of Rectum. D. Smith, San Francisco.—p. 223.
Craniocerebral Injuries: Study of Twelve Hundred Cases. D. H. Werden, Los Angeles.—p. 226.
*Sigmoid Sinus Thrombosis. R. Levy and H. I. Laff, Denver.—p. 233.
Weight Reducing Diets. T. H. McGavack, San Francisco.—p. 238.
An Aid in Collections. J. H. Shephard, San Jose.—p. 242.

Renal Tuberculosis.—According to Day, when a tuberculous lesion has advanced to the renal pelvis or collecting tubules, renal tuberculosis never completely heals because of the handicap of hindered drainage and back-pressure due to tuberculous changes in the ureteral wall; that is to say, aside from other possible reasons a tuberculous kidney excreting tubercle bacilli cannot recover because an incurably strictured ureter interferes with normal drainage and peristalsis. When complete healing does occur, the tuberculous process is limited to the cortex and it has never extended to the pyramid or collecting tubules. Until the tuberculous process has extended to a calix or the collecting tubules, pus and tubercle bacilli of renal origin will not be found in the urine and therefore, up to this time, renal tuberculosis cannot be said to have been "clinically established."

Sigmoid Sinus Thrombosis.—Levy and Laff present a case showing the classic signs of sigmoid sinus thrombosis in which, at operation, no sigmoid sinus could be found. Following the eradication of a hemorrhagically inflamed mastoid the patient recovered, without further intervention, supporting the view that the sepsis was due to an osteothrombotic phlebitis of the small veins. A specimen found in the dissecting room showing a unilateral absence of the sigmoid sinus is presented in support of their contention that such cases may be encountered at operation. This type of sigmoid sinus anomalies should be kept in mind while one is operating for sinus thrombosis. The authors state that the diagnosis of sinus thrombosis should be made from the history and clinical symptoms rather than by a too rigid dependence on the results of special tests that have been devised. These tests are of greater value in determining the side for operation in cases of bilateral otitis media. Blood cultures and blood studies, and especially the Schilling count, are of diagnostic and prognostic aid and should be utilized. Although a panicky attitude at the first rise of temperature in the course of a suppurative otitis media is to be deplored, surgical intervention in properly diagnosed cases of sinus thrombosis is productive of brilliant results.

Journal of Biological Chemistry, Baltimore

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Ribosephosphoric Acid from Xanthylic Acid: II. P. A. Levene and S. A. Harris, New York.—p. 9.
Effect of Dietary Deficiencies on Phospholipid Metabolism. Betty R. Monaghan.—p. 21.
Comparison of Wu and Kjeldahl Methods of Serum Protein Determination. L. R. Tuchman and H. Sobotka.—p. 35.
Spectrophotometric Determination of Certain Blood Pigments. G. B. Ray, H. A. Blair and C. I. Thomas.—p. 63.
Studies on Crystalline Insulin: XVI. Action of Ammonium Hydroxide and of Iodine on Insulin. H. Jensen, E. Schock and E. Sollers.—p. 93.
Lactose in Nutrition. O. L. Kline, J. A. Keenan, C. A. Elvehjem and E. B. Hart.—p. 121.
Relationship Between Chemical Structure and Physiologic Response: III. Factors Influencing Excretion of Uric Acid. A. J. Quick, with technical assistance of Mary A. Cooper, New York.—p. 157.
Effect of Epinephrine on Lipid Excretion. Elsie Hill and A. E. Koehler, Santa Barbara, Calif.—p. 185.
Assay of Vitamins B and G as Influenced by Coprophagy. N. B. Guerrant and R. A. Dutcher.—p. 225.
Determination of Iron in Cow's Milk and Human Milk. F. Reis and H. H. Chakmakjian, Boston.—p. 237.
Acid-Base Equilibrium in Abnormal Pregnancy. D. M. Kydd, H. C. Oard and J. P. Peters, New Haven, Conn.—p. 241.
Acid-Base Balance Disturbance of Pregnancy. V. C. Myers, E. Muntwyler and A. H. Bill, Cleveland.—p. 253.
Iron and Thorium Precipitation of Biologic Fluids for Sugar and Other Analyses. A. Steiner, F. Urban and E. S. West.—p. 289.
Action of Copper in Iron Metabolism. C. A. Elvehjem and W. C. Sherman.—p. 309.
Studies on Ketosis: II. Comparative Ketolytic Action of Glucose, Galactose, Fructose and Sucrose. H. J. Deuel, Jr., Margaret Gulick and J. S. Butts.—p. 333.

Journal of Experimental Medicine, New York

56: 455-608 (Oct. 1) 1932

Studies on Typhus Fever: IX. Serum Reactions of Mexican and European Typhus Rickettsia. H. Zinsser and M. R. Castaneda, Boston.—p. 455.
Immunologic Behavior of Second Protein (Livetin) of Hen's Egg Yolk. T. H. Jukes and H. D. Kay.—p. 469.
Properties of Causative Agent of Chicken Tumor: VI. Action of Associated Inhibitor on Mouse Tumors. J. B. Murphy and E. Sturm, New York.—p. 483.
Active Immunization Against Poliomyelitis. M. Brodie.—p. 493.
Comparison Between Convalescent Serum and Nonconvalescent Serum in Poliomyelitis. M. Brodie.—p. 507.
Studies on Quantitative Action of Specific Enzyme in Type III Pneumococcus Dermal Infection in Rabbits. K. Goodner and R. Dubos.—p. 521.
Study of Therapeutic Mechanism of Antipneumococcic Serum on Experimental Dermal Pneumococcus Infection in Rabbits: I. Presence in Antipneumococcic Serum of Non-Antibacterial Therapeutic Factor. A. B. Sabin, New York.—p. 531.
Formation of Macrocytes and Microcytes from Red Corpuscles in Hanging Drop Preparations. J. Auer, St. Louis.—p. 551.
Studies on Immunity to Swine Influenza. R. E. Shope, Princeton, N. J.—p. 575.
Studies on Shwartzman Phenomenon: I. Detoxification of Meningococcus Culture Filtrates. H. M. Klein, New York.—p. 587.
Infectious Myxomatosis (Sanarelli) in Pregnant Rabbits. D. H. Sprunt, New York.—p. 601.

Medical Annals of District of Columbia, Washington

1: 247-280 (Oct.) 1932

Status of Serum Therapy in Poliomyelitis. W. H. Park, New York.—p. 247.
Certain Noteworthy Faults in Medical Writing. R. M. Hewitt, Rochester, Minn.—p. 254.
*Clinical Evaluation of Transurethral Resection of Prostate. W. C. Stirling, Washington.—p. 257.
Typhus-Spotted Fever Group. A. S. Rumreich, Washington.—p. 263.
Chemomedical Studies of Pathologic Conditions. M. X. Sullivan, Washington.—p. 266.

Transurethral Resection of Prostate.—Stirling states that the indications for resection over prostatectomy are rather definite and clear cut and include all minor obstructions at the vesical outlet and malignant conditions of the prostate. In the large, vascular, intravesical type of prostate, prostatectomy is the method of choice. In the early detection and removal of prostatic obstruction, resection has great possibilities, obviating the impairment of the vital systems so often seen following complete blockage. The average hospitalization period is approximately ten days, which saves the patient considerable time and money. Prostatic resection is a valuable adjunct to prostatectomy but will not replace it. The same careful preparation with decompression and building up of the cardiac and renal systems is required in resection as in prostatectomy. Resection of the prostate is a highly technical procedure and should be undertaken only by those capable of handling any surgical complication that may ensue.

Public Health Reports, Washington, D. C.

47: 2039-2076 (Oct. 14) 1932

*Epidemic of Motor Neuritis in Cincinnati, Ohio, Due to Drinking Adulterated Jamaica Ginger: History, Symptomatology and Clinical Report. C. E. Kiely and M. L. Rich.—p. 2039.
Id.: Pathologic Report. A. R. Vonderahe.—p. 2053.
Id.: Epidemiologic Report. T. J. LeBlanc and W. E. Brown.—p. 2054.

47: 2077-2103 (Oct. 21) 1932

Experimental Transmission of Tularemia by Mosquitoes. C. B. Philip, G. E. Davis and R. R. Parker.—p. 2077.

Epidemic of Neuritis Due to Adulterated Jamaica Ginger.—Kiely and his associates state that on March 9, 1930,

press dispatches reported an epidemic paralysis of the legs ascribed to drinking jamaica ginger extract, popularly known as "jake." The following day there was admitted to the Cincinnati General Hospital a tabetic patient whose condition was complicated by rapidly progressive foot and wrist drop, and within a few days patients began coming with self-made diagnoses. Up to and including May, 316 cases were admitted. Confiscation of the suspected shipment by the state prohibition department, an order prohibiting the sale of jamaica ginger except on a physician's prescription, and the widespread publicity given by the press are to be credited with the suppression of the epidemic. The first symptoms of which these patients complained after drinking the "new" jamaica ginger were those of gastro-enteritis. They were not present in every patient. This gastro-intestinal upset occurred within a few hours after drinking and varied greatly in its severity. In some it consisted only in a feeling of nausea; in others there was only diarrhea. In the majority, however, there was nausea, vomiting, abdominal cramps, and diarrhea. In a few the condition was severe enough to cause blood in the stool. As a rule these symptoms lasted only a day or so, and then after an interval the symptoms of neuritis appeared. A sample group of 117 cases was studied from an epidemiologic standpoint. No history of contact could be elicited to which any real significance could be attached. No common factor appeared in food intake. Of the 117 patients 106 were males, and only 1 was a Negro. Ages ranged from 21 to 79, with a mean age of 47.8 years. On questioning, all but one patient admitted drinking jamaica ginger. The time between the ingesting of the jamaica ginger and the onset of paralysis varied between thirteen hours and six weeks. From seven to fourteen days is a fair approximation of this factor. The majority of patients had been regular drinkers of jamaica ginger, some over a period of ten years, and so jamaica ginger alone was not the causative agent, but some element, unknown at that time, not ordinarily found in jamaica ginger. This element made its appearance in the ginger probably sometime during January or February, 1930.

Radiology, St. Paul

19: 203-268 (Oct.) 1932

Organization of Tumor Clinic in General Hospital. M. Cutler, Chicago. —p. 203.
Peculiar Regeneration of Bone, Following Maggot Treatment of Osteomyelitis. M. M. Pomeranz, New York.—p. 212.
Visceral Displacement in Pneumonia: Roentgenologic and Experimental Study. Ching Wu, Chicago.—p. 215.
Technic of Intravenous Urography: Apparatus and Method of Compressing Ureters, Used in Four Hundred and Eleven Cases. J. Abowitz, Los Angeles.—p. 228.
*Spectrophotometric Analysis of Color of Skin Following Irradiation by Roentgen Rays. M. Harris, E. T. Leddy and C. Sheard, Rochester, Minn.—p. 233.

Spectrophotometric Analysis of Color of Skin.—Harris and his associates give detailed readings of six subjects whose skin was analyzed every day for fifty-two days after roentgen irradiation. The authors state that spectrophotometry offers an accurate method of recording the changes of color in the skin following irradiation. The course of the erythema is cyclic, or wavelike, persisting over a period of months. Fairly definite points occur chronologically at which the erythema is at a minimum. Changes in the content of pigment of the skin are due to a primary effect of the rays on the pigment, or on the metabolic processes by which pigment is formed. The content of pigment is immediately affected by irradiation. The pigment follows a course independent of the course of the erythema. The hue of the skin following irradiation remains constant. The changes in redness of the skin following roentgen irradiation are due to changes in the saturation of the hue.

Southwestern Medicine, Phoenix, Ariz.

16: 397-442 (Oct.) 1932

Neurologic Diagnostic Criteria in Diseases of Brain. C. W. Irish, Pasadena, Calif.—p. 397.
Plastic Surgery. C. von Wedel, Oklahoma City.—p. 409.
Facial Pains: Differential Diagnosis and Treatment. M. A. Glaser, Los Angeles.—p. 411.
Brain Abscess from the Otologist's Point of View. R. A. Duncan, Amarillo, Texas.—p. 417.
Immunization and Treatment of Diphtheria. C. F. Milligan, Clayton, N. M.—p. 420.
Brain Abscess and Meningitis from Trauma (Fractured Skull): Case Report. E. B. Thompson, El Paso, Texas.—p. 424.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

British Medical Journal, London

2: 739-780 (Oct. 22) 1932

The Harveian Oration on the Debt of Preventive Medicine to Harvey and the College of Physicians, Delivered Before the Royal College of Physicians of London, Oct. 18, 1932. G. Newman.—p. 739.
Genital Prolapse: Observations on Its Diagnosis, Mechanism and Treatment. H. L. Murray.—p. 744.
Etiology of Dental Caries. E. W. Fish.—p. 747.
Id. May Mellanby.—p. 749.
Acute Osteomyelitis in Children. C. P. G. Wakeley.—p. 752.

Journal of State Medicine, London

40: 559-618 (Oct.) 1932

Anomalies in the Interpretation of Industrial Dermatoses. R. P. White. —p. 559.
Problems of Immunization in Public Health. C. O. Stallybrass.—p. 573.
Study of the Findings in One Hundred and Fifty Cases of Colitis. E. C. Lowe.—p. 580.
*Some Clinical Observations on Use of Thallium Acetate in Treatment of Ringworm of Scalp. H. M. Mitchell.—p. 583.
Meat Inspection. P. F. Dolan.—p. 589.
Bovine Tuberculosis and Milk. A. McLean.—p. 597.
Problem of Mental Deficiency in Country District. A. M. Critchley. —p. 603.
Pediculosis as Public Health Problem. S. A. Nelson.—p. 608.

Thallium Acetate in Treatment of Ringworm of Scalp.—Mitchell's experience in the use of thallium acetate as a depilatory in the treatment of tinea of the scalp extends over a period of five years, during which time he treated 200 patients varying in age from 6 months to 12 years. After the examination of the urine to exclude the presence of any pathologic condition of the kidneys, which is a definite contraindication to the use of thallium, the child is weighed naked and the weight converted into kilograms and from 8.5 to 9 milligrams of the drug per kilogram is administered in a little sweetened water. A simpler procedure is to multiply the weight of the child in pounds by 4, which gives the required dose of thallium in milligrams. If proper precautions are taken, the author sees nothing against the use of thallium acetate in the treatment of ringworm of the scalp, especially in children under the age of 4. Provided the patients are kept in bed for two days after the drug has been administered, toxic symptoms rarely develop, and if they do they are seldom severe and pass off quickly. The after-treatment is most important in obtaining satisfactory results; a careful examination of the whole scalp should be made with the ultraviolet beam after epilation is apparently complete, so as to detect and remove any infected stumps that have failed to come out and thus minimize the risk of reinfection. The administration of thallium acetate should, as far as possible, be limited to children under the age of 4, and a second or third dose should be given only at considerable intervals.

Lancet, London

2: 823-876 (Oct. 15) 1932

Establishment of Immunity in Some Infectious Fevers. J. Broadbent. —p. 823.
Subcutaneous Rupture of Popliteal Artery: Report of Two Cases. C. P. G. Wakeley and W. O. Reid.—p. 829.
*After-Effects of Eclampsia, with Especial Reference to Hypertension and Chronic Nephritis. Janet Breakey.—p. 832.
Influence of Sexual Cycle on Breast Lesions. Helen Ingleby.—p. 835.
Use of Sanocrysin in Pulmonary Tuberculosis. H. E. Mansell.—p. 837.
Manipulative Surgery in General Practice. A. S. B. Bankart.—p. 840.

After-Effects of Eclampsia.—From her observations of a review of 333 cases of eclampsia treated since 1908 at the Jessop Hospital for Women, Sheffield, Breakey observed that in normal parous women there is a steady rise of blood pressure with increasing age, at any rate up to the age of 60. There is a slight depression between the ages of 40 and 50. After eclampsia the blood pressure rises more rapidly and to a greater height. The depression occurs as on the control curve but is exaggerated, and the readings at the upper end are modified by death in the worst cases. There is a fairly definite indication (after an initial drop) of a rise with advancing time; and a slight indication of a rise of blood pressure with further pregnancies. Chronic nephritis develops in a number of women after eclampsia, and this in some cases is severe enough to cause early death. There appears to be a direct relation between

the age and parity of the patient, and the occurrence of hypertension and nephritis. Both are more liable to occur in multiparas who are over 30 at the time of the attack. Both occur more frequently after the antepartum type. There is no evidence that subsequent conception is rendered less likely by an attack of eclampsia. Fertility is lessened after this condition in that miscarriage and stillbirth occur more frequently than in normal women. Albuminuria is much more likely to complicate subsequent pregnancies after eclampsia than in normal cases. In a certain number of cases a "toxemia sequence" occurs. Eclampsia may begin or end the sequence or may itself recur.

Medical Journal of Australia, Sydney

2: 497-528 (Oct. 22) 1932

Treatment of Compound Fractures of Lower Limb. J. Hoets.—p. 497.
Primary Treatment of Compound Fractures of Lower Limb. G. Bell.—p. 501.
Nutritional Aspects of Depopulation and Disease in Western Pacific, Especially in Papua. W. M. Strong.—p. 506.

South African Medical Journal, Cape Town

6: 583-614 (Sept. 24) 1932

General Principles in Preoperative and Postoperative Treatment. G. Sacks.—p. 585.
Malaria in Natal: Impressions of and Personal Observations on Recent Epidemic of Malaria in Maritzburg. C. E. L. Burman.—p. 591.
Modified Diazo Reaction in Diagnosis of Typhoid Fever. P. H. Symons.—p. 594.
Modern Developments in Treatment and Diagnosis: I. Radiology and the General Practitioner. F. H. Dommisse.—p. 598.

Chinese Medical Journal, Shanghai

46: 853-964 (Sept.) 1932

*Relapsing Fever in Shanghai: First Report. R. C. Robertson.—p. 853.
*Artificial Pneumothorax Treatment for Lobar Pneumonia: Report of Six Cases. K. H. Li.—p. 886.
Cyst of Urachus with Calculus Formation. A. C. Siddall.—p. 894.
Dental Education in China. A. F. Baranoff.—p. 899.
Entamoeba Histolytica and Trichomonas Hominis in Liver Abscess: Report of Case. J. Gray and Mary N. Andrews.—p. 902.

Relapsing Fever.—Robertson discusses the epidemiology of relapsing fever as it occurs in China. He presents a combined clinical and pathologic report on 350 cases in Shanghai. The laboratory investigations which are recorded are of the nature of a preliminary report. The conclusions which he draws from his observations are that: 1. The louse is the most probable vector in the Shanghai cases. 2. The cultivation of the spirochete in suitable nutrient mediums has been successfully carried out. Interesting light on the life history of the spirochete is indicated by further study of the cultures from infected lice and patients suffering from the disease. 3. The immunologic phenomena which have been demonstrated have a bearing on the clinical manifestations of the disease. It is also noted that the "adhesion reaction" will be of value in differentiating strains of spirochetes. 4. Preliminary observations on the body reservoir of the spirochetes during apyrexial periods have been made. 5. The prevalence of relapsing fever in endemic areas could be readily controlled by the application of existing public health knowledge.

Artificial Pneumothorax Treatment for Lobar Pneumonia.—Li reports six cases of lobar pneumonia treated by artificial pneumothorax. Following treatment, immediate relief of pain was noted in all cases in which pleurisy was present. Drop of temperature, pulse and respiration in each case with disappearance of dyspnea and onset of general well being was prompt. Five patients fully recovered. One of these died; but in this case the response after the first artificial pneumothorax treatment for pain, temperature, pulse and respiration was equally prompt.

Journal of Oriental Medicine, South Manchuria

17: 33-44 (Oct.) 1932

Roentgenologic Demonstration of Spleen and Liver. G. Irie.—p. 33.
Nomenclature of Chinese Medicines. T. Okanishi.—p. 36.
Effect of Morphine Injections on Blood Sugar and Adrenalin in Dogs. Y. Tachikawa.—p. 37.
Aspects of So-Called "Krukenberg's Tumors": Case of Ileocecal Cancer with Ovarian Metastases. Y. Morikawa.—p. 38.
Microscopic Demonstration of Urea by Means of Xanthydrol. K. Ogawa.—p. 40.
Climatic Factors in Pathogenesis of Pleurisy in Japanese Living in Manchuria. S. Nishihori.—p. 42.
Histogenous Mast Cells. M. Sasaki.—p. 43.

Archives de Médecine des Enfants, Paris

35: 633-696 (Nov.) 1932

*Immunization Against Measles by Placental Blood. J. Salazar de Souza.—p. 633.
Infantile Convulsions and Epilepsy. G. Heuyer and J. Dublineau.—p. 645.
Urinary Lithiasis in Infancy. S. Mekler.—p. 652.
Rare Case of Systematized Osteopathy. E. Feiguine and S. Tikhodéeff.—p. 654.
Intestinal Invagination in Measles; Failure of Barium Irrigation, Success of Surgical Intervention: Case. A. Béraud and R. Petrignani.—p. 664.
Fatal Case of Postvaccination Encephalitis. I. Trivas.—p. 668.
Chronic Primary Arthritis. J. Comby.—p. 670.

Immunization Against Measles by Placental Blood.—In four years Salazar de Souza injected 160 children, exposed to measles, with blood taken from human placentas. The number of cases in which immunization was obtained varied between 85 per cent in the first year and 63.4 per cent in the fourth year. In those cases in which immunization failed, the measles almost always assumed an attenuated form, generally without catarrh of the mucosae and the bronchi. The death rate among the patients who contracted measles in spite of the injection was only 2.27 per cent, compared to 12.7 per cent among the noninjected patients. The author thinks that the drop in the percentage of immunizations in the fourth year was due to tyndallization of the placental blood with formaldehyde solution. This procedure was resorted to in the fourth year because of the persistence of occasional suppurations, but a much smaller percentage of immunizations was obtained with 10 cc. injections of blood so treated than with the 4 cc. injections of nontyndallized blood or of blood tyndallized without formaldehyde solution, which were given in the first three years. After the blood has been collected from the placenta under strict aseptic conditions and has been sealed immediately in sterile ampules, it needs only to be tyndallized (without formaldehyde solution) once or twice at from 52 to 54 C. to be ready for use. The injection is usually followed by a rise of temperature generally lasting two days. The injection should be given intramuscularly and care should be taken to avoid leakage into the subcutaneous tissue. The author thinks that the immunity to measles produced by placental blood is due to the individuality of this blood. With its amino acids and other hypothetic products of internal secretion, it probably acts as a nonspecific antigen, stimulating the production of antibodies and resulting in a group immunization to anaphylactic and anaphylactoid states.

Paris Médical

2: 353-388 (Nov. 5) 1932

Diseases of Children in 1932. P. Lereboullet and F. Saint Girons.—p. 353.
Prandial Diarrhea of Breast Fed Infants. A.-B. Marfan.—p. 366.
*Diagnosis of Hypertrophy of Thymus in Nursling. G. Mouriquand and M. Bernheim.—p. 372.
*Treatment of Pregnant Woman Best Prevention of Congenital Syphilis. E. Lesné and Mme. Linossier-Ardoin.—p. 378.
Dilatation of Bronchi in Infancy: Aerial Pulmonary Cysts. L. Ribadeau-Dumas and Rault.—p. 381.

Diagnosis of Hypertrophy of Thymus in Nursling.—Mouriquand and Bernheim think that in rare but indisputable cases hypertrophy of the thymus is the cause of a respiratory syndrome appearing in nurslings in the first weeks or months of life and consisting of continuous or intermittent laryngeal dyspnea with stridor and concomitant cyanosis. Differential diagnosis of thymus hypertrophy requires roentgenographic examination and sometimes therapeutic tests. Clinically it may be confused with laryngospasm and above all with congenital stridor. The authors have found that the congenital stridor is almost always decreased by hyperextension of the head, whereas in thymus hypertrophy the stridor is exacerbated by this procedure. Other causes of stridor, such as foreign objects in the trachea, congenital intralaryngeal tumor, congenital goiter and tracheal stenosis, are more easily eliminated. Roentgenographic diagnosis of hypertrophy of the thymus demands an accurate knowledge of the normal shadow of the superior mediastinum and its variations. The roentgenogram should be made with the infant upright and during inspiration, so that the mediastinal shadow will be reduced to a minimum. If, under these conditions, there is a shadow which extends to the right and left significantly beyond the limits of the sternovertebral shadow and even beyond the normal shadow

of the large vessels of the base, it may be considered as a real shadow of the thymus. It should be borne in mind that, in all forms of laryngeal dyspnea which might be confused with thymus hypertrophy, there is respiratory congestion and vascular stasis which increases the mediothoracic shadow. In gangliopulmonary tuberculosis of early infancy which sometimes causes stridor the roentgenographic image is at times represented by a simple enlargement of the mediastinum or a rounded shadow surmounting the cardiac shadow like an enlarged thymus. Mediastinal tumors, mediastinal pleurisy and Pott's abscess are sometimes sources of confusion. The most certain criterion for diagnosis is the response to roentgen therapy. In authentic hypertrophy of the thymus the stridor and attacks of suffocation are diminished after the first irradiation. After several irradiations, respiration becomes normal and regression of the thymus is visible in the roentgenogram. If such results are not obtained and there is only a slight respiratory improvement after numerous irradiations, the diagnosis of thymus hypertrophy is doubtful.

Treatment of Pregnant Woman to Prevent Congenital Syphilis.—Lesné and Linossier-Ardoin found that 81 per cent of the children of mothers who received antisyphilitic treatment during pregnancy were normal. In cases of paternal syphilis in which the mother appeared free from infection and did not receive antisyphilitic treatment during pregnancy, 42 per cent of the children were normal; in cases of maternal syphilis treated only before pregnancy, 28 per cent of the offspring were normal. From these results they conclude that treatment during pregnancy is the best prophylaxis for congenital syphilis and should be employed in all cases in which the parents have a history of syphilis, whether acquired or hereditary and no matter how old the infection is. The necessity for this treatment arises from the frequency of latent and masked syphilis in women, the reactivation of infection under the influence of pregnancy, and the precocity of the lesions of congenital syphilis. Intravenous injection of arsphenamine is the best treatment. Bismuth preparations should be used only in case of resistance or intolerance to arsphenamine. The series of injections must be intense, and the interval between series should never exceed three weeks during the entire pregnancy. Not only did this treatment result in 81 per cent of normal offspring in the authors' experience, but the other 19 per cent were dystrophic children with negative Bordet-Wassermann reactions. The Bordet-Wassermann reaction should be tested in every pregnant woman even in the absence of clinical signs. If the mother receives serial injections during pregnancy and the infected parent has previously received adequate treatment, the authors think that preventive treatment of the child is useless and need not be undertaken unless serologic tests (which should be made every six months during the first four years) indicate the necessity.

Archiv für Gynäkologie, Berlin

151: 1-440 (Oct. 24) 1932. Partial Index

Aspects of Necrosis in Wall of Ovarian Cystomas. L. Nürnberger. —p. 16.
Tumors of Granulosa Cells of Ovary. W. P. Plate.—p. 26.
New Formation of Muscle Cells in Wall of Gravid Uterus. B. Fischer-Wasels.—p. 44.
Forceps Deliveries. E. Puppel.—p. 86.
*Fate of Foreign Body Left in Abdominal Cavity. G. L. Dawydov.—p. 98.
*Is Conception Capacity of Women Limited to Certain Predeterminable Days of Menstrual Cycle? G. Riebold.—p. 111.
Anatomic and Functional Changes of Rectum in Carcinoma of Cervix Uteri. G. Halter.—p. 126.
Behavior of Trypanocidal Function of Liver During Disease of Liver, During Gestation and During Uterine Carcinoma. H. Eufinger, M. Rothermundt and H. Wiesbader.—p. 150.
Investigations on Influence of Gravidity on Morphologic Structure of Pineal Body in Guinea-Pigs. H. Eufinger and H. Uhing.—p. 168.
Roentgenologic Symptomatology of Osteomalacia: Aspects of Viosterol Therapy. H. O. Kleine.—p. 182.
Significance of Function of Thyroid for Development of Castration Obesity. O. Bokelmann and W. Scheringer.—p. 190.
*Hormonal Analysis of Urine and of Secretion of Mammary Gland. E. W. Winter.—p. 201.

Foreign Body Left in Abdominal Cavity.—Dawydov relates the clinical history of a woman who had undergone a laparotomy for the removal of a fibrous nodule from the posterior wall of the uterus. With the exception of a temporary increase in the temperature the postoperative course was normal, but defecation became difficult and palpation revealed a compact mass in the posterior portion of the small pelvis. Subsequent examinations revealed no changes in this mass, and except for the constipation and occasional abdominal pains the woman felt well. Eight months after the operation a gauze tampon, 64 by 43 cm., was eliminated with the feces. Several days preceding this elimination, fever and peritoneal symptoms were observed, but after the tampon had been eliminated all these symptoms disappeared. Several years later the woman became pregnant and the delivery was normal. The author thinks that the penetration of the tampon into the rectum was facilitated by its incarceration between the uterus and the intestine. The tampon caused a necrosis of the intestinal wall, which finally resulted in perforation. This case induced the author to study the perforation of the intestinal wall by tampons in animal experiments. He found that small gauze tampons (6 by 4 cm.), when fixed to the rectum of dogs or rabbits, became encapsulated, for the organism has a tendency to isolate itself from the tampon by encapsulation, by elimination through the hollow organs (intestine or bladder) or by elimination through abdominal fistulas. The author thinks that the assumption that a tampon has been left in the abdominal cavity is no valid excuse for a new laparotomy when postoperative complications are absent. If the presence of a tampon in the abdominal cavity is certain and the postoperative course is normal, the tampon should not be removed until after the complete recovery of the patient. The author thinks that most methods recommended to prevent tampons from being left behind are no sure protection, but he considers helpful Döderlein's suggestion of using gauze that has been interwoven with bronze and that could readily be detected by roentgenoscopy.

Determination of Time of Ovulation.—Riebold reaches the conclusion that Knaus's method (abstracted in THE JOURNAL, Oct. 12, 1929, p. 1183, and Dec. 5, 1931, p. 1749) for the determination of the term of ovulation is applicable in all cases of regular mensual cycles from twenty-six to thirty days. In cycles of only three weeks, ovulation can likewise be predetermined, but since in each series of menstruations there may occur a variation of phases, these determinations are not all entirely reliable and may result in failures if one tries to generalize as Knaus has done. But by taking into consideration the various clinical factors, such as the midperiod pain, the intermenstrual leukorrhea and other intermenstrual and premenstrual symptoms, and the individual mensual cycle, it will be possible in many cases to determine the sterile as well as the fertile periods; however, it is necessary to keep an exact record of the days of menstruation and of all the pertaining symptoms.

Hormonal Analysis of Urine and of Mammary Gland Secretion.—Winter reports his investigations on the hormonal content of the urine and of the secretion of the mammary gland in the different physiologic and pathologic conditions. In the urine of the new-born child the ovarian hormone is present up to the third day after birth and the hormone of the anterior lobe of the hypophysis up to the ninth day. The mammary secretion of the newly born contains no hormones. In the colostrum of pregnant women the hormone of the anterior lobe of the hypophysis is present from the seventh month on and remains present in the mammary secretion up to the sixth day of the puerperium. The ovarian hormone is not present in the colostrum. In patients with hydatid mole, the hormone of the anterior hypophysis is present in the colostrum much earlier than during normal pregnancy. During the first stage of the menopause the urine contains the ovarian hormone, but during the last stage, as well as in genital carcinoma, pruritus vulvae and leukoplakia vulvae the urine frequently contains the follicle maturation hormone. Hormonal analysis of the urine of sexually mature women with menstrual anomalies does not explain the disturbance or give information about a suitable therapy. During dysmenorrhea the urine frequently contains the follicle maturation hormone, but during sterility none of the hormones are present in the urine. In cases of amenorrhea it is frequently possible to produce with the urine the anterior hypophyseal hormone reactions (I and II). The author thinks that the mammary secretion during pregnancy, in the newly born, during false pregnancy, amenorrhea and similar disturbances is due to a disturbance in the correlations between the ovarian and the hypophyseal hormone with involvement of the sympathetic nervous system: a predominance of the anterior lobe of the hypophysis is probably the principal cause.

Dermatologische Wochenschrift, Leipzig

95: 1569-1596 (Oct. 29) 1932. Partial Index

Histologic Studies on Formations Resembling Vascular Tumor but of Nevoid Origin and with Structure of Hemangio-Endothelioma. M. J. Per.—p. 1569.
Stasis Dermatosis Following Obliteration of Veins. O. Meyer.—p. 1574.
*Specificity of Lymphogranuloma Inguinale Reaction. W. Frei.—p. 1575.

Specificity of Lymphogranuloma Inguinale Reaction.—Frei maintains that the skin reaction produced with sterilized material from buboes of patients with lymphogranuloma inguinale has a high degree of specificity. He emphasizes particularly the absolute reliability of the positive reaction, for in hundreds of control tests on persons without lymphogranuloma inguinale he did not observe a single positive reaction. One case was only apparently an exception, since it was discovered later that the genital ulceration in this woman had been preceded by lymphogranuloma inguinale. He further states that mistakes may result from the injection of material that contains bacterial impurities, for the inflammation that follows such injections may be considered an unspecific lymphogranuloma inguinale reaction. He explains the causes of the apparently erroneous positive reactions observed by other investigators. In discussing the negative lymphogranuloma inguinale reaction he admits that it is not always reliable, as the reaction may be negative even when lymphogranuloma inguinale is actually present. Further, he states that patients with lymphogranuloma inguinale may show an intensified reactivity to other substances besides lymphogranuloma inguinale material, and he therefore warns that a positive reaction obtained in patients with lymphogranuloma inguinale with other than bubo material does not justify the assumption that the patient from whom the material was obtained has lymphogranuloma inguinale. To illustrate this he cites the case of a man with urethritis, whose urethral secretion produced a positive reaction in patients with lymphogranuloma inguinale, while the lymphogranuloma inguinale reaction was negative in himself and clinical observation and anamnesis revealed nothing indicative of lymphogranuloma inguinale.

Münchener medizinische Wochenschrift, Munich

79: 1745-1784 (Oct. 28) 1932

Observations on Clinical Significance of Hemo-Endocrinopathic Syndrome. L. Riccitelli.—p. 1745.
Efficiency of Obstetrics in Home. O. Fahlbusch.—p. 1746.
Menstruation and Diabetes Mellitus. R. Peperkorn.—p. 1748.
*Development of Ascites Under Insulin Treatment in Bronze Diabetes and Disappearance Following Discontinuation of Insulin. A. Bingel.—p. 1750.
*Tonsils and Their Conservative Treatment with Roeder's Suction Method. M. Jägermann.—p. 1751.
Roentgen Irradiation of Tonsils in Children. H. Zoepffel.—p. 1753.
Scarlet Fever and Meralgia Paraesthetica. O. Lade.—p. 1754.
Progress in Recognition and Treatment of Most Important Intoxications. E. Leschke.—p. 1755.
Simple and Reliable Method for Determination of Blood Sugar by Means of New Absolute Colorimeter. W. Thiel.—p. 1758.
Action of Weak Electric Current on Blood Sugar and Diabetic Disturbance of Metabolism. M. Dörle.—p. 1761.
Treatment of Localized Perspiration by Means of Ammonium Chloride. J. Mayr.—p. 1762.

Ascites Under Insulin Treatment in Bronze Diabetes.—Bingel relates the clinical histories of two patients with bronze diabetes, in whom ascites developed when insulin therapy was instituted but the ascites disappeared again when the insulin treatment was discontinued. He points out that insulin edemas are well known and he explains the mechanism of their pathogenesis, but the development of ascites is somewhat different, since it is the result of indirect insulin action. Insulin produces enlargement and swelling of the liver cells as the result of glycogen storage and water intake. Because of a connective tissue covering, the outward enlargement of the liver is only slight and the effects of the swelling of the cells is largely exerted on the lymph and blood channels within the liver, and thus a congestion ascites develops.

Conservative Treatment of Tonsils with Roeder's Method.—Jägermann points out that Roeder considered the tonsils not only an endocrine organ and the site of formation of lymphocytes but also an important excretory organ for the lymph stream and a central regulatory organ of the entire lymph vessel system. Roeder reasoned that, when as a result of inflammation of the tonsils there is a congestion of the lymph, the tonsils may produce injurious effects but that, if the flow of the lymph is reestablished by suitable methods, the injurious influence is counteracted, whereas when the tonsils are removed the elimination of the lymph is inhibited. Consequently he perfected and successfully employed a suction method by which pus particles and other waste materials are withdrawn from the tonsils. The author likewise found this method helpful not only in localized disorders of the tonsils but also in the sequelae of tonsillar disorders, in rheumatism, sciatica, myalgia and neuralgia, and in acute infectious diseases such as scarlet fever, measles and diphtheria. He thinks that, in view of the fact that a functional significance of the tonsils cannot be denied and that the removal of the tonsils involves dangers and does not always have the desired effect, it is advisable to try conservative therapy in the form of Roeder's suction treatment. He asserts that this method is simple and not dangerous and that it can be employed in small children as well as in old persons. Two or three treatments a week are usually sufficient, but in acute cases a more frequent application may be desirable.

Wiener klinische Wochenschrift, Vienna

45: 1337-1368 (Oct. 28) 1932

Heredity of Syphilis. R. Matzenauer.—p. 1337.
Symptoms of Corpus Callosum. E. Risak.—p. 1340.
*Connections Between Intermittent Articular Dropsy and Ovarian Function. A. Vogl.—p. 1344.
Successful Operation in Case of Bone Tumor of Membrane of Spinal Cord. Charlotte K. Krausz.—p. 1346.
Mechanical Icterus. K. Blond.—p. 1348.
Prolonged Treatment and Supervision in Hematologic Disorders. K. Singer.—p. 1349.
*Intravesical Irradiation with Ultraviolet Rays. H. Meschede.—p. 1350.
*Reexamination of Skin Reaction (Neuer) for Demonstration of Deep Gonorrheal Disorders. Erna Loewy.—p. 1352.
Vertigo, with Especial Consideration of Neurology. R. Leidler.—p. 1352.
Specific and Nonspecific Therapy in Septic Diseases. R. Boller.—p. 1355.

Intermittent Articular Dropsy and Ovarian Function.—According to Vogl, most authorities are of the opinion that the comparatively rare intermittent articular dropsy belongs to the angioneurotic disturbances, more particularly to the group of neurotic edemas, while others think that it is due to a dysfunction or hypofunction of the ovaries. As proof that disorders of the ovarian function cannot be the only pathogenic factor of intermittent articular dropsy the author cites the fact that the disorder occurs also in men and that in women the intervals between recurrences are frequently independent of the menstrual cycle. Moreover, not all cases respond to treatment with ovarian extracts and the disorder may entirely disappear for months and even years. The latter occurrence can sometimes be traced to intense psychic alterations. The author thinks that intermittent articular dropsy is due partly to constitutional inferiority of the articular apparatus, for there is a high incidence of articular disorders in the families of these patients, and partly to a constitutional angioneurotic factor. That in some patients the attacks concur with the menstrual period he considers due to the fact that during this period the irritability and the permeability of the vascular apparatus are increased. He warns against a one-sided evaluation of intermittent articular dropsy as an endocrine, particularly an ovarian, disorder and, although ovarian extracts may occasionally prove helpful, he thinks that it is wrong to consider a case as incurable if ovarian extracts do not improve the condition. On the contrary, various cases have been found to respond to different measures, to hydrotherapeutics, to salt-free diet, to a cinchophen preparation, to injections of arsenic, to the various forms of ovarian preparations, to change of climate and to hypnosis. The author thinks that the psychologic factor is probably quite often the most significant one, that most of these therapeutic measures are largely nothing but a masked psychotherapy, and that spontaneous remissions are possible.

Intravesical Irradiation with Ultraviolet Rays.—Meschede applies ultraviolet rays with a mercury burner in a quartz tube. The tube permits inspection of the bladder, which makes it possible to apply the rays to the diseased area. In the first experiments he administered only half of the erythema dose of the external skin, but systematic cystoscopic control finally convinced him that the vesical mucous membrane has a resistance to ultraviolet rays about ten times as great as that of the skin. He employed the intravesical irradiation, especially in tuberculosis of the bladder, but tried it also

in acute cystitis. The number of irradiations varied. In some cases twelve were given and in others either more or less. The intervals between the treatments were arranged so that from one to three irradiations were given each week. On the basis of six months' experience with this method, the author concludes that it is quite promising in that formerly incurable cases can be improved so that life becomes again bearable for these patients. He further points out that ultraviolet irradiation by means of quartz tubes has also been tried in other specialties, namely, in ophthalmology for the treatment of detachment of the retina. In these cases the quartz tube is applied to the sclera and it is stated that this method surpasses the former treatments.

Deep Gonorrheal Disorders.—Loewy reexamined a gonorrheal skin test that Neuer described in the *Wiener klinische Wochenschrift* (**45**:398 [March 25] 1932; abstr. THE JOURNAL, June 18, 1932, p. 2256). A preparation containing killed gonococci is applied to a scarified area. Because this reaction appeared valuable, the author decided to test its reliability. She tried it on eighty patients in different stages of gonorrhea and on twenty-six healthy persons. The results were disappointing as they tallied with the complement fixation reaction only in comparatively few cases: she concludes that in its present form the test has neither diagnostic nor prognostic value.

Zentralblatt für Gynäkologie, Leipzig

56: 2577-2624 (Oct. 22) 1932

Delivery in Cleft Pelvis. H. Goecke.—p. 2577.
*Is Decapitation of Delivered Head in Difficulties of Shoulder Delivery Suited to Entirely Replace Cleidotomy? A. Pohl.—p. 2582.
*Isolated Pregnancy Intoxication of Brain (Cerebropathia Toxica Gravidarum). H. Naujoks and H. Uffenorde.—p. 2588.
Sensitivity of Muscles of Uterine Tubes in Men and Animals to Pituitary Extract and to Epinephrine. F. Kammerhuber.—p. 2595.
Treatment of Eclampsism with Choline Ester. E. Schulze.—p. 2603.
Pathogenesis of Melena Neonatorum. L. Honecker.—p. 2609.
Hormone Therapy in Menstrual Anomalies. P. Weiss.—p. 2612.
Experiences with Ovarian Hormone Therapy in Amenorrhea and Dysmenorrhea. W. Scheidt.—p. 2615.
Presence in Cerebrospinal Fluid of So-Called Anterior Hypophyseal Hormone. K. Ehrhardt.—p. 2618.
Intrafollicular Ovarian Gravidity. W. Kötter.—p. 2619.

Decapitation or Cleidotomy?—Summing up the advantages and disadvantages of decapitation of the delivered head in comparison to cleidotomy during difficulties in shoulder delivery, Pohl states that much is to be said in favor of decapitation; namely, the rapidity and simplicity of the operation, the diminished danger of injuring the mother by instruments or protruding pieces of bone, and the greater reduction in the size of the shoulder girdle. Compared to decapitation, cleidotomy has no advantages and for this reason the author advises that cleidotomy be replaced entirely by decapitation with subsequent drawing down of the arms. Decapitation and not cleidotomy is absolutely necessary in the case of giant infants, in pelvic contraction, in difficulties with the soft parts, and when rapid delivery is necessary. Of course, as in every other obstetric operation the indications should be properly evaluated. Decapitation is advisable if, in case of a dead fetus following birth of the head, the delivery of the shoulders is impossible or difficult without reducing the width of the shoulders.

Isolated Pregnancy Intoxication of Brain.—Naujoks and Uffenorde state that cerebral changes during pregnancy have as a rule been observed only as complications of other pregnancy toxicoses. However, they observed a case which proves that an isolated pregnancy intoxication of the brain is also possible. The clinical history of this patient corresponds to the results of the postmortem examination. The woman had no icterus, hyperemesis, attacks of spasms nor alterations in the peripheral nerves, but all manifestations, the psychic as well as the organic, could be explained by an isolated intoxication of the brain. The authors consider the differentiation of the isolated pregnancy intoxication of the brain, the so-called cerebropathia toxica gravidarum, from other pregnancy toxicoses not merely of theoretical importance but also of practical significance. On the basis of the reported case they recommend caution in the evaluation of psychic disturbances during pregnancy and consider it inadvisable to designate every abnormality in the psychic behavior of gravidas as merely "nervous." They think that the more severe psychic disturbances, particularly those that concur with somatic cerebral manifestations, are life endangering, cannot be effectively counteracted by conservative measures and necessitate interruption of pregnancy.

Upsala Läkareförenings Förhandlingar, Uppsala

38: I-XIX (Sept. 17) 1932. Partial Index

Festschrift on Centennial of Upsala Läkareförening
*Investigation into Strength of Skin Capillaries and Indirectly into Vitamin C Standard of School Children in District of Norrbotten, North of Arctic Circle. G. Falk, K.-O. Gedda and G. F. Göthlin.—part II.
Prognostic Significance of Positive Tyrosine and Leucine Reaction in Urine in Hepatitis. B. Hamne.—part VIII.
*Contribution to Study of Pathogenesis of Laryngopharyngeal Myoclonias. C. Grill and E. Laurén.—part X.
*Observations on Electrocardiograms in Extrasystole. A. Kristenson.—part XIV.
*Contribution to Question of Occurrence of Fat Substances in Sputum and Lungs. U. Quensel.—part XV.
*Contribution to Cytology of Sputum. J. Lundquist.—part XVI.
*Neurinoma in Gastro-Intestinal Canal: Three Cases. E. Nordlander.—part XVIII.
*Frequency of Sarcoma in Different Age Groups. G. Nyström.—part XIX.

Strength of Skin Capillaries and Vitamin C Standard of School Children.—Falk and his associates found that in school children those with high intake of vitamin C, according to the diet questionnaire, at the end of winter have high capillary strength, those with low vitamin C intake, low capillary strength. Their results corroborate that children of school age require a much larger intake of vitamin C, roughly estimated as double the amount, than do adults, to reach a normal capillary strength and a normal vitamin C standard.

Pathogenesis of Laryngopharyngeal Myoclonias.—Grill and Laurén cite nine previously published cases of laryngopharyngeal myoclonias in which histopathologic examination was made and describe their case, interpreted as grave cerebral arteriosclerosis, in a man, aged 60, with repeated attacks of apoplexy and symptoms of pseudobulbar paralysis as well as continued, rhythmic, bilateral laryngopharyngeal myoclonias. They conclude that the lesions of the cerebellum caused the myoclonic syndrome by blockage of the regulatory influx between the olivary bodies, cerebellum and tegmental nucleus as well as the gray substance of the protuberance, thus producing a disturbance of the stabilizing mechanism in the affected musculature.

Electrocardiograms in Extrasystole.—Kristenson found that, on experimental stimulation of points on the anterior surface of the heart, electrocardiograms of the dextrogram type are obtained from the part of the heart nearest to the basal electrode, of the levogram type from the part of the heart nearest the apical electrode, and, on excitation of an intermediary zone, electrocardiograms of transition type. The field over which this intermediary zone extends seems to be at right angles to an imaginary line of union between the two electrodes, both in his case and in those previously reported.

Fat Substances in Sputum and Lungs.—Quensel's results apparently indicate that the lungs normally in some way participate in the fat metabolism of the organism. A storage of fat substances on the one hand, and on the other an elimination of fat substances, particularly anisotropic substances, in the urine were established.

Cytology of Sputum.—Lundquist found that the characteristic cells of sputum, the so-called large sputum cells, identical with the so-called alveolar phagocytes, are the same in patients with various respiratory disorders and that they are present in greater number in well persons.

Neurinoma in Gastro-Intestinal Canal.—In Nordlander's two cases of gastric neurinoma and one of neurinoma of the small intestine the tumor was not palpable. One case of gastric neurinoma presented general dyspeptic symptoms; in the other cases there were larger hemorrhages. Microscopic examination of the intestinal neurinoma, which was due to ileus, revealed signs of malignant degeneration, rare in tumors of this kind.

Sarcoma in Different Age Groups.—Nyström reports that the official statistics on causes of death in Sweden from 1911 to 1929, containing 4,447 cases of sarcoma, together with a material of 2,080 microscopically diagnosed cases of sarcoma from different parts of Sweden, show that, apart from the relatively greater frequency of sarcoma in childhood and youth, the age curve for sarcoma quite agrees with that for carcinoma.